ICP/EXT-04-00359

Health and Safety Plan for the Field Sampling and Remediation of the V-Tank Area New Sites at Test Area North, Waste Area Group 1, Operable Unit 1-10

Idaho Completion Project

Bechtel BWXT Idaho, LLC

June 2004

ICP/EXT-04-00359
Project No. 24063
Revision 0

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June 2004

Idaho Completion Project
Idaho Falls, Idaho 83415

Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
Under DOE Idaho Operations Office
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Approved by

Gary E. McDannel Waste Area Group 1 Project Engineer	6-30-04 Date
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ABSTRACT

This Health and Safety Plan establishes the processes and requirements that will be used to eliminate or minimize health and safety risks to personnel performing field sampling and remediation in and around TSF-46, TSF-47, and TSF-48 at Test Area North, Waste Area Group 1, Operable Unit 1-10, as required by the Occupational Safety and Health Administration standard “Hazardous Waste Operations and Emergency Response” (29 CFR 1910.120). This Health and Safety Plan contains information about the hazards involved in performing the work as well as the specific actions and equipment that will be used to protect personnel while working at the task site.

This Health and Safety Plan is intended to give safety and health professionals the flexibility to establish and modify site safety and health processes throughout the entire span of site operations based on the existing and anticipated hazards

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FIGURES

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ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
ANSI	American National Standards Institute
ARDC	Administrative Record and Document Control
CAM	continuous air monitor
CERCLA	Comprehensive Environmental, Response, Compensation and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CNS	central nervous system
CWA	controlled work area
DAC	derived air concentration
DAR	document action request
dBA	decibel A-weighted
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
DWA	designated work area
EDF	engineering design file
EPA	U.S. Environmental Protection Agency
FR	Federal Register
FSP	field sampling plan
FTL	field team leader
GDE	guide
GI	gastrointestinal
HASP	health and safety plan
HAZWOPER	hazardous waste operations and emergency response

HEPA	high-efficiency particulate air
HPGe	high-purity germanium detector
HSO	health and safety officer
HWMA	Hazardous Waste Management Act
IARC	International Agency for Research on Cancer
ICDF	INEEL CERCLA Disposal Facility
ICP	Idaho Completion Project
IET	Initial Engine Test
IH	industrial hygienist
ILRW	intermediate-level radioactive waste
INEEL	Idaho National Engineering and Environmental Laboratory
ISMS	Integrated Safety Management System
JSA	job safety analysis
LOFT	Loss of Fluid Test
MCP	management control procedure
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OMP	Occupational Medical Program
OSHA	Occupational Safety and Health Administration
OU	operable unit
PCB	polychlorinated biphenyl
PEL	permissible exposure limit
PLN	plan
PPE	personal protective equipment
ppm	parts per million

PRD	program requirements document
RadCon	radiological control
RCIMS	Radiological Control and Information Management System
RCT	radiological control technician
RCRA	Resource Conservation and Recovery Act
RWP	radiological work permit
SMC	Specific Manufacturing Capability
STD	standard
STL	sampling team leader
SVOC	semivolatile organic compound
SWP	safe work permit
TAL	target analyte list
TAN	Test Area North
TCLP	toxicity characteristic leaching procedure
TLV	threshold limit value
TPR	technical procedure
TSF	Technical Support Facility
TWA	time-weighted average
USC	United States Code
UV	ultraviolet light
VCO	Voluntary Consent Order
VOC	volatile organic compound
VPP	Voluntary Protection Program
WAG	waste area group
WCC	Warning Communications Center

Health and Safety Plan for the Field Sampling of the V-Tank Area New Sites at Test Area North, Waste Area Group 1, Operable Unit 1-10

1. INTRODUCTION

1.1 Purpose

This Health and Safety Plan (HASP) establishes the processes and requirements that will be used to prevent health and safety hazards from affecting personnel conducting sampling and remediation activities of soil—as described in the "Field Sampling Plan for the V-Tank Area New Sites, for Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft)"[a] and the "Group 2 Remedial Design/Remedial Action Work Plan Addendum for the Assessment and Cleanup of V-Tanks Area New Sites, for the Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft)"[b]—to support Comprehensive Environmental, Response, Compensation, and Liability Act (CERCLA) activities at TSF-46, TSF-47, and TSF-48 (collectively known as V-Tank Area New Sites) at Test Area North (TAN), Waste Area Group (WAG) 1, Operable Unit (OU) 1-10, at the Idaho National Engineering and Environmental Laboratory (INEEL). The location of the INEEL within the State of Idaho is shown in Figure 1-1.

1.2 Scope and Objectives

This HASP has been written to meet the requirements of the Occupational Safety and Health Administration (OSHA) standard, "Hazardous Waste Operations and Emergency Response" (29 CFR 1910.120). This HASP governs all work at TSF-46, TSF-47, and TSF-48 sites at WAG 1, OU 1-10 that is performed by INEEL management and operations contractor personnel, subcontractors, and any other personnel who enter the project area.

This HASP has been reviewed and revised as deemed appropriate by the health and safety officer (HSO) in conjunction with other project personnel and management to ensure its effectiveness and suitability.

1.3 Idaho National Engineering and Environmental Laboratory Site Description

The INEEL, a government-owned facility managed by the U.S. Department of Energy (DOE), is located in southeastern Idaho, 51.5 km (32 mi) west of Idaho Falls, as shown in Figure 1-1. The INEEL encompasses approximately 2,305 km^2 (890 mi^2) of the northwestern portion of the eastern Snake River Plain and extends into portions of five Idaho counties.

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a. DOE/NE-ID, 2004a, "Field Sampling Plan for the V-Tank Area New Sites, for Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft)," DOE/NE-ID-11156, U.S. Department of Energy Idaho Operations Office, June 2004.

b. DOE/NE-ID-2004b, "Group 2 Remedial Design/Remedial Action Work Plan Addendum for the Assessment and Cleanup of V-Tank Area New Sites, for the Test Area North, Operable Unit 1-10 (Draft)," DOE/NE-ID-11152, U.S. Department of Energy Idaho Operations Office, June 2004.

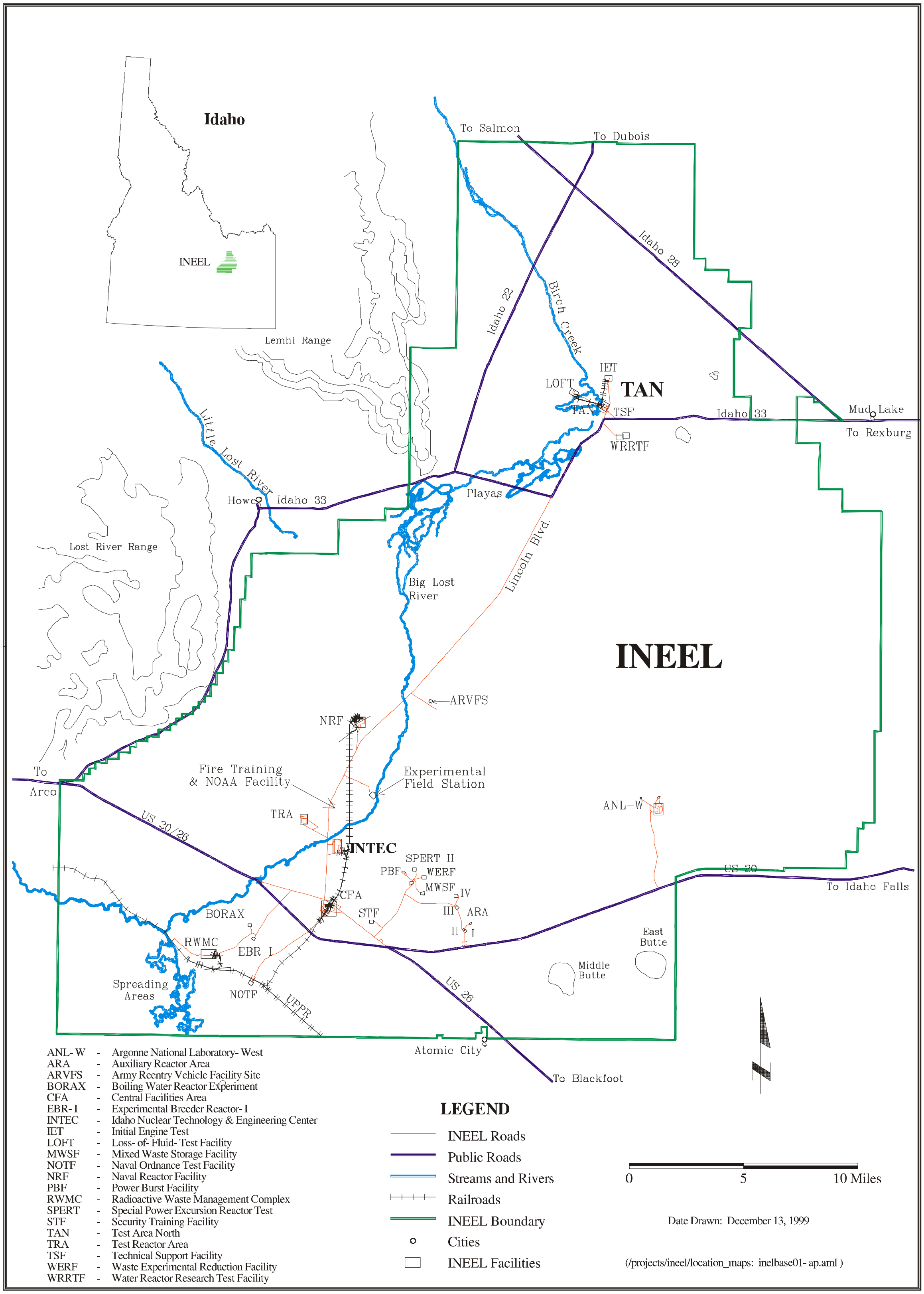

Figure 1-1. Location of Test Area North at the Idaho National Engineering and Environmental Laboratory.

In November 1989, because of confirmed contaminant releases to the environment, the U.S. Environmental Protection Agency (EPA) placed the INEEL on the National Priorities List (54 FR 48184) of the "National Oil and Hazardous Substances Pollution Contingency Plan" (40 CFR 300). In response to this listing, the DOE, EPA, and the Idaho Department of Environmental Quality (herein referred to as the Agencies) negotiated the *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (DOE-ID 1991a) and the *Action Plan for Implementation of the Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (DOE-ID 1991b). The Agencies signed these documents in 1991, establishing the procedural framework and schedule for developing, prioritizing, implementing, and monitoring response actions at the INEEL in accordance with CERCLA (42 USC § 9601 et seq.), Resource Conservation and Recovery Act (RCRA) (42 USC § 6901 et seq.), and the Idaho Hazardous Waste Management Act (Idaho Code § 39-4401 et seq.).

Test Area North includes four different facilities: (1) Technical Support Facility (TSF), (2) the Initial Engine Test (IET) Facility, (3) Water Reactor Research Test Facility, and (4) the Specific Manufacturing Capability (SMC)/Loss-of-Fluid Test (LOFT) Facility. To better manage cleanup activities, the INEEL was divided into 10 WAGs. The TAN Facility—designated as WAG 1—includes fenced areas and immediate areas outside the fence lines at the TSF, the IET Facility, the LOFT Facility, the SMC Facility, and the Water Reactor Research Test Facility (DOE-ID 1999).

The Federal Facility Agreement and Consent Order (DOE-ID 1991a) also established 10 operable units (OUs) within WAG 1 consisting of 94 potential release sites (DOE-ID 1999). The sites include various types of pits, spill areas, ponds, aboveground and underground storage tanks, and a railroad turntable. A comprehensive remedial investigation/feasibility study was initiated in 1995 to determine the nature and extent of the contamination at TAN under OU 1-10, defined in the Federal Facility Agreement and Consent Order as the *Comprehensive Remedial Investigation/Feasibility Study for the Test Area North Operable Unit 1-10 at the Idaho National Engineering and Environmental Laboratory* (DOE-ID 1997). The OU 1-10 Remedial Investigation/Feasibility Study culminated with the finalization of the *Final Record of Decision for Test Area North, Operable Unit 1-10* (DOE-ID 1999), which provides information to support remedial actions for eight sites where contaminants present an unacceptable risk to human health and the environment. The Record of Decision for OU 1-10 identified Cs-137 as the only contaminant of concern requiring remediation and established a final remediation goal of 23.3 pCi/g to depths down to 10 ft for Cs-137.

1.4 Test Area North Background and Project Site Description

As shown in Figure 1-2, TAN is located in the north-central portion of the INEEL. The facility was constructed between 1954 and 1961 to support the Aircraft Nuclear Propulsion Program, which developed and tested designs for nuclear-powered aircraft engines. When Congress terminated this research in 1961, the area's facilities were converted to support a variety of other DOE research projects. From 1962 through the 1970s, the area was principally devoted to the LOFT Facility, where reactor safety testing and behavior studies were conducted. Beginning in 1980, the area was used to conduct research and development with material from the 1979 Three-Mile Island reactor accident (DOE-ID 1998). During the mid-1980s, the TAN Hot Shop supported the final tests for the LOFT Program. Current activities include the manufacture of armor for military vehicles at the SMC Facility and nuclear storage operations at the TSF. Decontamination and decommissioning have been completed recently at the IET Facility.

The intermediate-level radioactive waste (ILRW) Management System was constructed at the TSF to collect, store, and treat wastewater generated by the Aircraft Nuclear Propulsion Program and other programs at various TAN facilities. The TAN/TSF ILRW Management System is composed of three subsystems: the ILRW Feed Subsystem (Tanks V-1, V-2, V-3, and V-9), the ILRW Treatment

Subsystem (Liquid Waste Treatment Building [TAN-616]), and the ILRW Holding Tank Subsystem (PM-2A tanks).

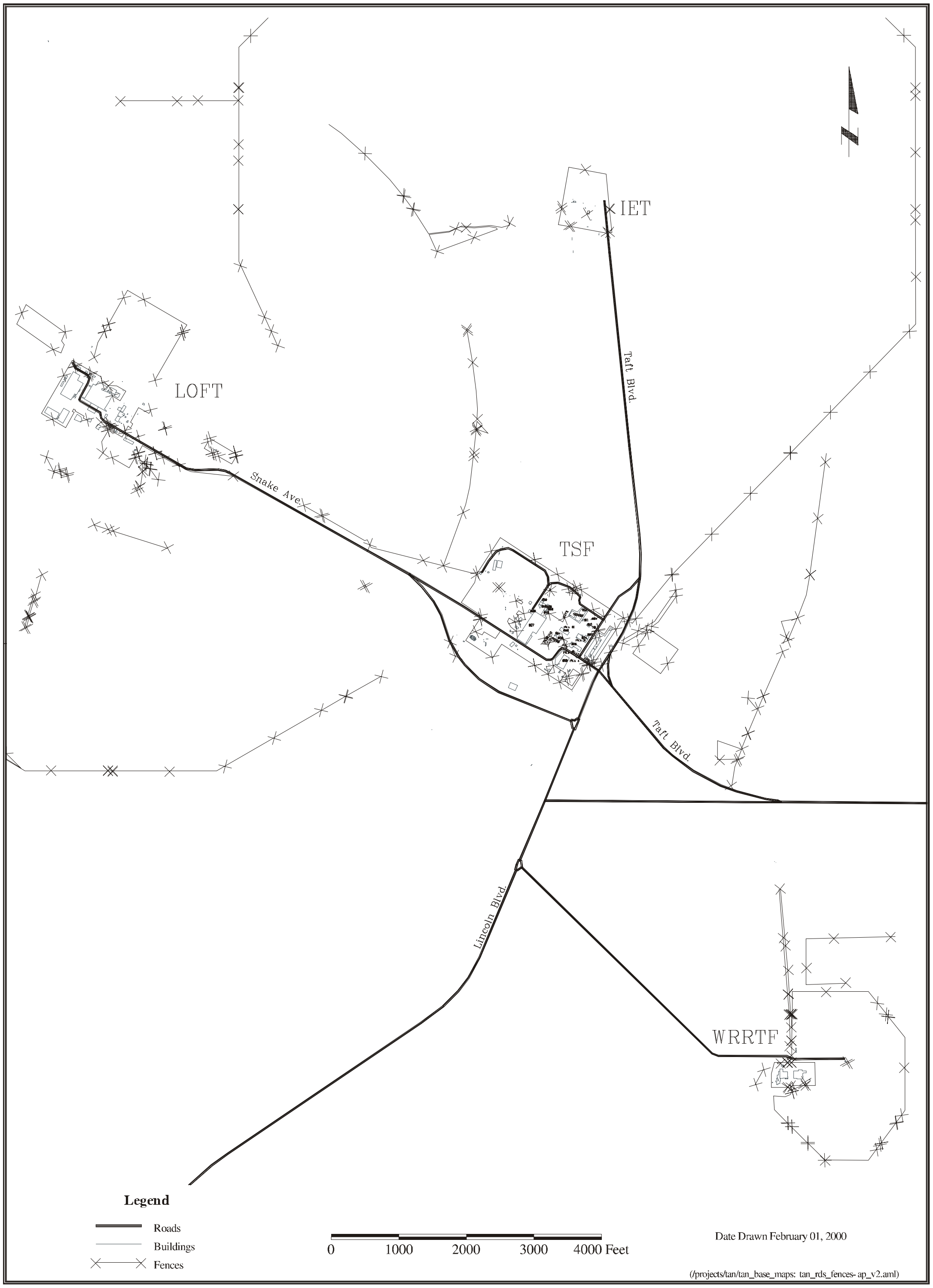

Figure 1-2. Test Area North facilities.

1.5 Project Site Description

The V-Tank Area New Sites consists of three newly identified areas requiring evaluation under CERCLA. The TSF-46 (TAN-616 soil) site consists of soil within and around the footprint of TAN-616, the Liquid Waste Treatment Facility. The TSF-47 (TAN-615 sewer line soil) is a site of an apparent past rupture of a sewer/industrial line located underneath and to the west of TAN-615, the Assembly and Maintenance Building. The TSF-48 (TAN-615 sump soil) site consists of the soil beneath two sumps, now removed, that were located in the south end of TAN-615.

The ILRW system was designed to collect, store, and concentrate radionuclide-contaminated liquid waste from TAN facilities. The tanks and piping associated with both the V-Tanks and PM-2A tank sites are part of this system. Because of their close proximity to the V-Tanks (see Figure 1-3), these new sites potentially contain contaminants that have leaked from the ILRW system. This HASP covers the soil sampling and remediation activities to be conducted at these three new TSF locations at TAN.

1.5.1 TSF-46, TAN-616 Soil

The TSF-46 site consists of soil within and around the footprint of TAN-616. The TAN-616 facility is a concrete structure located north of TAN-607. The building was within 2.4 m (8 ft) of the V-Tanks (V-1, V-2, and V-3) on the east and 18.2 m (60 ft) of TAN-607 on the south. The outside dimensions of the facility are 10.9 × 14 m (36 × 46 ft) and the building is approximately 7 m (23 ft) tall.

In 1955, TAN-616 was constructed and contained an evaporator system, which was designed to concentrate radionuclide-contaminated liquid waste, mostly originating from the decontamination of equipment and facilities. The evaporator system operated from 1958 until the early 1970s; TAN-616 was taken out of service in 1972 because of evaporator vessel integrity problems and a temporary evaporator system installed above the holding tanks (PM-2A tanks, V-13 and V-14). From 1972 until 1975, wastewater might have been transferred via TAN-616 from the collecting tanks (V-1, V-2, and V-3) directly to the holding tanks, which at this time served as feed tanks to this temporary evaporator system (INEEL 2001).

Currently, TAN-616 and the Liquid Waste Treatment System are undergoing closure under the Hazardous Waste Management Act (HWMA) (Idaho Code § 39-4401 et seq.) and RCRA (42 USC § 6901 et seq.) and subsequent decontamination, decommissioning, and dismantlement. Soil underneath and around the facility will be excavated to support the demolition and removal of TAN-616, which is discussed further in the Notice of CERCLA Disturbance: Excavation of Soils Surrounding TAN-616 (NCD-T04-03, Revision 2). Debris, including concrete rubble and paint chips, that becomes commingled with CERCLA soil will be sampled and managed along with the CERCLA soil.

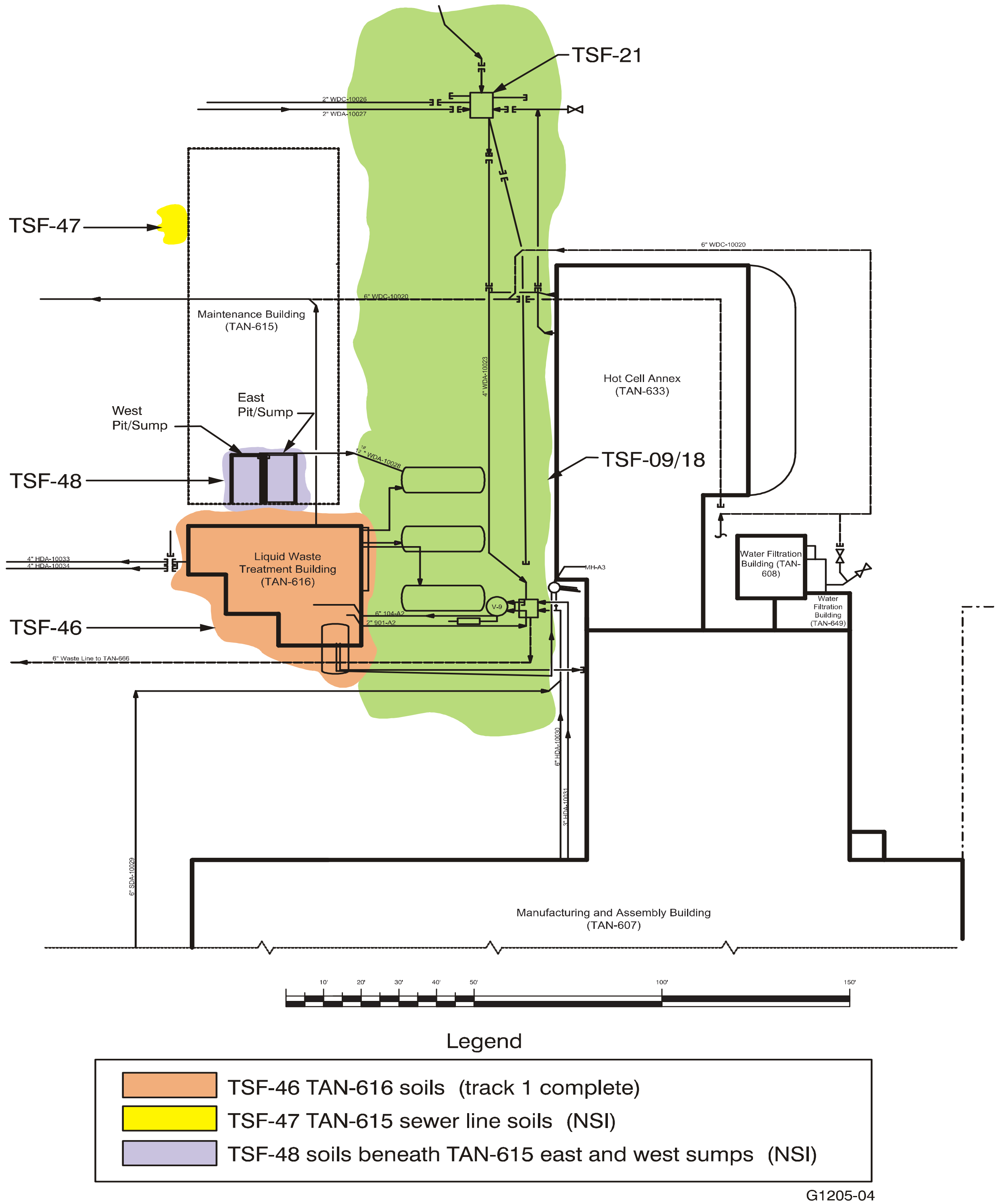

Figure 1-3. Location of TSF-46, -47, and –48.

1.5.2 TSF-47, TAN-616 Sewer Line Soils

The TSF-47 is a site of an apparent past sewer/industrial line leak that was discovered by deactivation, decontamination, and decommissioning crews in 2002 while excavating the TAN-615 building piers during dismantlement of the facility. The soil in the vicinity of the piping was damp and the sewer line was still active. A radiological survey performed on this soil identified contamination of 30,000 dpm.

The contaminated soil was 10–11 ft below ground surface approximately 5 ft outside the west wall of TAN-615, and just above where an east-west 6-in. cast iron sanitary sewer line tied into a concrete line. Based on INEEL Drawing No. 423666, the 6-in. sanitary sewer line upstream of the location of the contaminated soil has several sewer and industrial discharge feeder connections from several TAN buildings, including TAN-607, TAN-608, TAN-633, and TAN-615. Further excavation revealed that approximately 8 ft west from the tie-in point for the TAN-615 highbay drains, a crude concrete and plastic bag patch had been applied to the 6-in. drain line. At the time of discovery, the damaged section of pipe, as well as the section of pipe that contained the old tie-in from the highbay drains, was replaced with new pipe and the area backfilled with clean soil (INEEL 2004a).

1.5.3 TSF-48, TAN-615 East and West Pits/Sumps Area Soil

The TSF-48 site consists of the soil beneath and around two pits/sumps, now removed, that were located in the south end of TAN-615 approximately 6 ft away from the TAN-616 building's foundation walls. The TAN-615 building was originally constructed in 1955 to assemble and test nuclear reactors for the Aircraft Nuclear Propulsion Program, although the building was never used for this purpose.

The east pit/sump was located in the test area and was referred to as the test pit/sump. The pit was 8 × 14 × 8 ft deep and contained a sump located in the northwest corner. The sump's dimensions were 12 × 12 in. with a depth of 3.8 ft. The test area originally was used for the testing of fuel assemblies. The east pit/sump and ancillary piping were reported to be out of service for their original use prior to 1971. Between 1971 and 1978, there was no known use of the east pit/sump, and TAN operations were in a shutdown mode during most of that time. Around 1978, the pit/sump was decontaminated and then converted to use as part of the LOFT control rod drive mechanism testing. From 1978 to about 1985, testing included filling and evacuating the east pit/sump with demineralized water. The pit/sump and ancillary piping were out of service by 1985 when assembly of LOFT fuel ceased.

The west pit/sump was located in the decontamination area and was referred to as the decontamination pit. The pit was 8 × 14 × 8 ft deep and contained a sump located in the northeast corner. The sump's dimensions were 12 × 12 in. with a depth of 9 in. The west pit/sump and ancillary piping were reported to be out of service for their original use prior to 1971. The decontamination tanks, pump, a fume hood, and exhaust stack were removed before the early 1970s when the mission of the Actuator Facility was changed to support the LOFT Program. Between 1971 and 1976, there was no known use of the west pit/sump.

The TAN-615 building, including the east and west pits/sumps, was decontaminated and dismantled in 2002. The TAN-615 southeast and southwest pits were excavated to a depth of 11 to 12 ft and then backfilled to approximately 4 ft below ground surface. The project completion is described in *Final Report for the Decontamination and Decommissioning of the Test Area North-615* (INEEL 2003).

1.6 Previous Soil Investigations

1.6.1 TSF-46, TAN-616 Soil Sites

Over the years, some characterization has been performed on the soil around the perimeter of the TAN-616 facility. In 1983, the surface around TAN-616 (excluding the far west and south side) was gridded and surface radiation readings were collected. The highest radiation observed was on the east side of TAN-616, which has been investigated under CERCLA Site TSF-09/18. Radiological activity was also evident on the north and west (near the vestibule and control room) sides of TAN-616, but at significantly lower levels than the east side soil.

Soil to the north of the TAN-616 facility was included in the radiologically controlled area encompassing the TSF-09/18 spill area and might be similarly contaminated. The soil north of TAN-616 (between TAN-615 and TAN-616) in the area of the TAN-616 evaporator pit entrance ramp was sampled in August 2002 by the DD&D Project in support of WAG 1. This sampling took place during excavation between the buildings as TAN-615 was being demolished. Three composite samples were collected along the south end of TAN-615 from the surface down to a depth of 4 ft, and one sample was composited from a bag of soil that had already been excavated. All samples were analyzed for radiological constituents (gamma spectroscopy, gross alpha-beta, and Sr-90); polychlorinated biphenyl (PCBs); semivolatiles, volatiles, toxicity characteristic leaching procedure (TCLP) metals, TCLP semivolatiles, TCLP volatiles, and total metals. Tables containing complete analytical results can be found in the Field Sampling Plan (FSP) (see footnote a).

1.6.2 TAN-615 Sewer Line Soil

Soil samples surrounding a leaking sanitary waste line were collected in July 2002. One sample and one duplicate were collected from a box containing soil that had already been excavated. The other two samples were collected from two locations (labeled “east” and “west”) beneath the sanitary line where green poly plastic was wrapped around the piping. All samples were composite samples and were analyzed for radiological constituents (gamma spectroscopy, gross alpha-beta, and Sr-90), PCBs, semivolatiles, volatiles, and total metals. All organics compounds analyzed were below detection limits. Tables containing complete analytical results can be found in the FSP (see footnote a).

1.6.3 TSF-48, TAN-615 East and West Pits/Sumps Area Soil

The TSF-48 site consists of the soil beneath two sumps (east and west) that were located in the south end of TAN-615 approximately 6 ft away from the TAN-616 building’s foundation walls.

1.6.3.1 East Sump. The TAN-615 east pit/sump was evaluated under the Voluntary Consent Order (VCO) Program in 2001–2002 and determined never to have managed RCRA hazardous waste. At that time, the pit/sump contained a small amount of dry residual material (dirt, fiberglass debris, and sediment) in the bottom sump section. Samples of the residual material were collected in May 2001 and analyzed for radiological constituents (gamma spectroscopy, gross alpha-beta, and Sr-90), TCLP metals, volatiles, semivolatiles, and PCBs. The analytical results determined that the solid residue was radiologically contaminated with Cs-137, Sr-90, and Co-60. The residual material was also characteristically hazardous because of lead and cadmium. It is believed that the lead and cadmium are derived from control rod materials during testing in the pit (EDF-2167).

The residuals from the TAN-615 east pit/sump were removed and disposed of as mixed low-level waste and the east pit/sump was decontaminated (scabbled) of visible staining in 2002 during deactivation, decontamination, and decommissioning of TAN-615. The concrete was re-sampled, and the contaminants of concern (lead and cadmium) were below regulatory levels. The remaining concrete was verified to be low-level waste only. The east pit/sump was removed, the area was backfilled with clean fill, and the concrete later transported to the Radioactive Waste Management Complex for disposal as low-level radioactive waste.

Soil samples from beneath the TAN-615 east pit/sump (lowest level) were collected in July 2002. One soil sample was collected 12 in. under the sump (approximately 13 ft below ground surface). A second composite soil sample was collected from three different locations 12 in. beneath the pit (approximately 9 ft below ground surface). Both samples were analyzed for radiological constituents (gamma spectroscopy/gross alpha-beta, and Sr-90) and total metals. Complete analytical results tables can be found in the FSP (see footnote a).

1.6.3.2 West Sump. The west pit/sump was evaluated under the VCO Program in 2001–2002 and determined never to have managed RCRA hazardous waste. The west sump, which had been filled with gravel and capped with an 8-in. concrete slab, was sampled with a drill rig at three different locations within the pit, including the gravel at the base of the sump. Core samples were collected at a depth from 4.5 to 9 ft below floor grade and analyzed for radionuclides, total and TCLP metals, and TCLP semivolatiles. The results showed the presence of low levels of radionuclide contamination (primarily from the presence of Cs-137 and Sr-90, but other gamma-emitting radionuclides such as Co-60, Ra-226, and U-235 also were detected). No RCRA TCLP contaminants exceeded RCRA regulatory limits (EDF-2167).

As part of the decontamination and decommissioning of TAN-615 in the summer of 2002, the west pit slab, gravel, and sump were removed and transported to the Radioactive Waste Management Complex for disposal as low-level radioactive waste. At that time, a sample of the soil beneath the pit floor was collected and analyzed for radiological constituents (gamma spectroscopy, gross alpha-beta, and Sr-90) and total metals. Complete analytical results tables can be found in the FSP (see footnote a).

2. SCOPE OF WORK

This HASP covers all remedial actions and field sampling to be performed at TSF-46, TSF-47, and TSF-48. The planned activities for remediation of the V-Tank Area New Sites are summarized as follows:

- Perform site preparation and mobilization activities
- Conduct soil sampling and excavation
- Decontaminate equipment and ancillary support systems
- Perform confirmation sampling of the excavation area in accordance with the applicable FSP
- Backfill and compact the excavated area using clean soil (less than 23.3 pCi/g Cs-137) after confirmation sampling results are verified
- Perform final soil contouring, compaction, and reseeding.

This scope of work was intentionally written in general terms to allow project flexibility. These activities are considered low hazard but still involve walking/working surface hazard; slip, trip, and fall potential; and lifting hazards. Vehicular traffic other than that used in the above activities may also be present.

2.1 Remedial Actions

Excavation of contaminated soil will be performed if soil exceeds the final remediation goal and requires remedial action under the TAN Record of Decision. Earthwork at the remediation sites will include excavation and transportation of contaminated soil to the ICDF for disposal; excavation, hauling, and placement of backfill material; and grading and reclamation seeding of the excavated areas.

The New Sites soil remediation will be conducted in cooperation with the demolition of the TAN-616 facility and the excavation of TSF-18/09 V-Tank soil. The soil removed during the excavation phases will be placed in temporary staging areas in the vicinity of the V-Tanks area of contamination. The soil on the north, west, and south sides of TAN-616 (TSF-46 and TSF-48) will be excavated and stockpiled in the staging area to facilitate the demolition of the TAN-616 structure. Before soil excavation underneath the TAN-616 building, gamma screening using a field-calibrated portable high-purity germanium detector (HPGe) gamma spectrometer will be performed to identify radiologically contaminated hot spots. Soil that is contaminated above the final remediation goal will be remediated to a depth of 10 ft and if necessary stockpiled before shipment to the INEEL CERCLA Disposal Facility (ICDF).

The contaminated soil around the sewer line (TSF-47) will be excavated in conjunction with the excavation of the V-Tank soil during either the Phase II or Phase III excavations. The contaminated soil around the sewer line will be sampled and if necessary stockpiled before shipment to the ICDF. The extent of the contamination around the sewer line will be determined using a HPGe gamma spectrometer.

Precautions such as water spray, wind monitoring, and visual observations will be used to prevent the generation of fugitive dust. Equipment necessary for excavation of the contaminated soil can remain within the decontamination control zones until completion of excavation activities. Barriers, such as tarps and containment pads, will be used to separate the equipment and vehicles that are used to haul excavated soil from the area to prevent the spread of contamination. These vehicles will not be driven directly onto contaminated areas. This strategy will minimize the spread of contamination and eliminate the need to perform any additional decontamination.

2.2 Sampling Activities

Specific procedures are required to handle the samples collected during the V-Tank Area New Sites sampling activities to ensure that the data are representative of the soil within the TSF-46, TSF-47, and TSF-48 sites. The project FSP (see footnote a) provides detailed information on sampling activities. Limited soil samples will also be collected under HWMA/RCRA closure and used for assessment of the TSF-46 site, as outlined in the *Field Sampling Plan for the HWMA/RCRA Closure of the TAN-616 Liquid Waste Treatment Facility* (INEEL 2004a). Results from the samples collected under the closure project will be used in conjunction with the samples collected under the V-Tank Area New Sites FSP to assess the area.

Sampling procedures will be discussed each day in a presampling meeting. The meeting discussion will include, but will not be limited to, the following: sampling activities for the day, responsibilities of team members, health and safety issues, and waste management. Any deviations from the sampling strategy presented in this FSP will be documented in the field-sampling logbook. All sample locations will be identified, staked, and clearly marked with the appropriate designations prior to sampling.

Sampling at the TSF-46, TSF-47, and TSF-48 sites will be done after remediation using a field-calibrated in situ HPGe gamma spectrometer. In situ gamma spectrometer systems are used in two modes: field and sample. Both modes will be used for sampling of the V-Tank Area New Sites. In field mode, the HPGe detector is used to conduct wide-area surveys of an area, usually a 10–50-ft diameter circle. In sample mode, the detectors are placed inside a field portable lead cave and sample pucks are collected and placed inside the lead cave in direct contact with the HPGe detector unit.

Sampling at the TSF-46, TSF-47, and TSF-48 sites will be done after remediation using a two-phased approach. Phase 1 will consist of gamma scans (wide-area surveys) to determine residual contamination levels and locate any hot spots. These wide-area surveys will cover essentially 100% of the excavated area. Results from these surveys will be used to determine if further remediation is needed and identify locations for collecting puck samples. If additional excavation is undertaken to remove areas with elevated levels of contamination, then these areas will be re-screened before collecting the puck samples.

Phase two will consist of collecting soil pucks in the excavated areas. After remediation has been deemed complete at TSF-46, TSF-47, and TSF-48, puck samples will be collected to assess the accuracy of the measurements obtained from the wide-area surveys and to verify that the residual soil concentration population mean at the 95% upper confidence level does not exceed the 23.3 pCi/g final remediation goal for Cs-137. If results from this sampling indicate the Cs-137 soil concentration population means exceed the final remediation goal, then additional excavation and subsequent puck re-sampling will be necessary. If the results from the puck samples confirm that the Cs-137 population mean does not exceed the final remediation goal at the 95% upper confidence limit, then remediation activities will be considered complete for the site and site restoration will proceed.

If areas are identified where there is evidence of a suspected release, postremediation soil samples at the bottom of the excavation will be collected and the samples analyzed for V-Tank soil contaminants. A risk analysis will be completed for these samples using the risk-based screening process outlined in the *Risk-Based Screening Approach for Waste Area Group 1 Soils* (INEEL 2004b) to determine if additional contaminants of concern are present and evaluate if a potential revision to the OU 1-10 Record of Decision final remediation goals is warranted.

Soil removed from the TSF-46, TSF-47, and TSF-48 sites either will be bagged or stockpiled at or near the excavation site, or at a CERCLA storage area, for subsequent disposal at the ICDF. Samples will be collected from each of the soil pile(s) (or collection of bagged soil), composited, and analyzed using conventional methods to characterize the soil for acceptance into ICDF. The "Waste Management Plan for the V-Tank Area New Sites, for Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft)"[c] describes management of soil and other waste generated from the V-Tank Area New Sites project.

Table 2-1 lists the planned sampling locations, the number of samples required, and the analyses that will be performed on each sample. These tables are subject to change based on results from field surveys; any changes will be noted in the sample logbook.

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c. ICP, 2004, "Waste Management Plan for the V-Tank Area New Sites, for Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft)," ICP/EXT-04-00360, Idaho Completion Project, June 2004.

Table 2-1. Sample locations and analyses performed.

Site	Location	Number of Samples	Analyses
TSF-46/48	Excavated soil from within and outside the TAN-616 footprint	Five composite samples from each collection of bags or pile of excavated soil	CLP metals, PCBs, SVOCs (CLP-TAL), VOC (CLP-TAL), TCLP (metals, VOCs, SVOCs), gamma spectroscopy, Am-241, Cm-isotopic, I-129, Ni-63, Np-237, Pu-isotopic, Ra-226, Sr-90, tritium, U-isotopic
	Excavated soil and debris (concrete rubble) from within and outside the TAN-616 footprint	Five composite samples from each collection of bags or pile of excavated soil	CLP metals, PCBs, SVOCs (CLP-TAL), VOC (CLP-TAL), TCLP (metals, VOCs, SVOCs), gamma spectroscopy, Am-241, Cm-isotopic, I-129, Ni-63, Np-237, Pu-isotopic, Ra-226, Sr-90, tritium, U-isotopic
	Additional bias samples	As needed based on specified field conditions (minimum of three)	CLP metals, PCBs, SVOCs (CLP-TAL), VOC (CLP-TAL), TCLP (metals, VOCs, SVOCs), gamma spectroscopy, Am-241, Cm-isotopic, I-129, Ni-63, Np-237, Pu-isotopic, Ra-226, Sr-90, tritium, U-isotopic
	Confirmatory samples	To be determined based on results of field surveys	Cs-137 using HPGe a
TSF-47	Excavated soil from around and beneath the sewer line	Five composite samples from each collection of bags or pile of excavated soil	CLP metals, PCBs, SVOCs (CLP-TAL), VOC (CLP-TAL), TCLP (metals, VOCs, SVOCs), gamma spectroscopy, Am-241, Cm-isotopic, I-129, Ni-63, Np-237, Pu-isotopic, Ra-226, Sr-90, tritium, U-isotopic
	Additional bias samples	As needed based on specified field conditions (minimum of three)	CLP (metal, VOCs, SVOCs), PCBs, CLP metals, PCBs, SVOCs (CLP-TAL), VOC (CLP-TAL), gamma spectroscopy, Am-241, Cm-isotopic, I-129, Ni-63, Np-237, Pu-isotopic, Ra-226, Sr-90, Tritium, U-isotopic
	Confirmatory samples	To be determined based on results of field surveys	Cs-137 using HPGe a
TSF-48	Excavated soil from beneath the TAN-615 sump area	See TSF-46.	See TSF-46 analyses.
	Confirmatory samples	Included in sampling of excavated soil from TSF-46	See TSF-46.

a. If additional contaminants of concern other than Cs-137 are identified from previous sampling efforts, characterization samples will be analyzed for those contaminants of concern as well.

CLP = Contract Laboratory Program
HPGe = high-purity germanium
PCB = polychlorinated biphenyl
TAL = target analyte list
TAN = Test Area North
TCLP = toxicity characteristic leaching procedure
TSF = Technical Support Facility
SVOC = semivolatile organic compound
VOC = volatile organic compound

3. HAZARD IDENTIFICATION AND MITIGATION

The overall objective of this section is to identify existing and anticipated hazards associated with field sampling and remediation activities at the V-Tank Area New Sites at WAG 1, OU 1-10 scope of work and to provide controls to eliminate or mitigate these hazards. These include the following:

- Evaluation of each project task to determine the safety hazards and radiological, chemical, and environmental exposure potentials to project personnel by all routes of entry
- Establishment of the necessary monitoring and sampling required to evaluate exposure and contamination levels, determine action levels to prevent unacceptable exposures, and provide specific actions to be followed if action levels are reached
- Determination of necessary engineering controls, isolation methods, administrative controls, work practices, and (where these measures will not adequately control hazards) personal protective equipment (PPE) to further protect project personnel from hazards.

The purpose of this hazard identification section is to lead the user to an understanding of the occupational safety and health hazards associated with project tasks. This will enable project management and safety and health professionals to make effective and efficient decisions related to the equipment, processes, procedures, and the allocation of resources to protect the safety and health of project personnel.

The magnitude of danger presented by these hazards to personnel entering work zones is dependent on both the nature of tasks being performed and the proximity of personnel to the hazards. Engineering controls will be implemented (whenever possible) along with administrative controls, work practices, and PPE to further mitigate potential exposures and hazards. This section describes the chemical, radiological, safety, and environmental hazards that personnel might encounter while conducting project tasks. Hazard mitigation provided in this section in combination with other work controls (e.g., technical procedures, work orders, job safety analysis, and Guide [GDE] –6212, “Hazard Mitigation Guide for Integrated Work Control Process”) also will be used where applicable to eliminate or mitigate project hazards.

3.1 Chemical and Radiological Hazards and Mitigation

Personnel might be exposed to chemical and radiological hazards while performing field sampling and remediation activities at the TSF-46, TSF-47, and TSF-48 at WAG 1, OU 1-10. Table 3-1 lists the worker health-based chemical and radiological contaminants of concern that might be encountered while conducting project tasks. Since the source of contamination at TSF-46, TSF-47, and TSF-48 is anticipated to be from the V-Tanks, these constituents are based on the contaminants of concern in the V-Tank contents and the surrounding soil.

Table 3-1. Evaluation of health-based contaminants of concern at TSF-46, TSF-47, and TSF-48.

V-Tank Contaminant Chemicals (Chemical Abstract Service No., Vapor Density, and Ionization Energy)	Exposure Limit [a] (PEL/TLV/DAC)	Routes of Exposure [b]	Symptoms of Overexposure (Acute and Chronic)	Target Organs/ System	Labeled as a Carcinogen (Source[c,d])	Exposure Potential (All Routes without Regard to PPE)
Aroclor-1260 (11096-82-5)	Not available (nearly identical product—Aroclor-1254 [chlorodiphenyl 54%Cl]): 0.5 mg/m^3—TLV 0.5 mg/m^3—PEL	Ih, Ig, Con, S	Eye irritation, chloroacne, liver damage, reproductive effects	Skin, eyes, liver, reproductive organs	Not available Aroclor-1254[c] (chlorodiphenyl 54% Cl) ACGIH - A3[c] IARC - 2A[c] NTP - R[c]	Low potential Maximum concentration detected = 310 mg/kg (sludge)
Arsenic (Inorganic compounds, as As) (7440-38-2)	TWA: 0.01 mg/m^3	Ih, Abs, Con, Ig	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, respiratory irritation, hyperpigmentation	Liver, kidneys, skin, lungs, lymphatic system	Yes—A1- ACGIH	Low potential Maximum concentration detected in soil = 19 mg/kg
Carbon monoxide (6308-0) Vapor density 0.789	50 ppm-PEL 25 ppm-TLV	Ih.	Headache, confusion, nausea, dizziness; excessive exposure could be fatal.	Blood oxygen-carrying capacity	No	Low-moderate potential associated with equipment operation and cutting operations
Chromium (7440-47-3)	0.5 mg/m^3—TLV (Cr III) 0.01 mg/m^3—TLV (Cr VI) 1 mg/m^3—PEL (Cr metal) 0.5 mg/m^3 —PEL (Cr III)	Ih, Ig, Con, S	Eye and skin irritation, lung fibrosis	Eyes, skin, respiratory system	Chromium VI[c] ACGIH—A1[c] IARC—1[c] NTP—K[c]	Low-moderate potential Maximum concentration detected = 1,100 mg/kg (sludge)
Bis(2-ethylhexyl) phthalate (117-81-7)	5 mg/m^3—TLV 5 mg/m^3—PEL	Ih, Ig, Con	Eye and mucous membrane irritation	Eyes, respiratory system, CNS, liver, reproductive system, GI tract	ACGIH—A3[c] IARC—2B[c] NTP—R[c]	Low potential Maximum concentration detected = 1,100 mg/kg (sludge)
Lead (7439-92-1)	0.05 mg/m^3—TLV 0.05 mg/m^3—PEL	Ih, Ig, Con	Weakness, weight loss, anemia, nausea, vomiting, paralysis, constipation, insomnia, abdominal pain, kidney disease, eye irritation	GI tract, CNS, kidneys, blood, gingival tissue, eyes	ACGIH—3[c] IARC—2B[c]	Low potential Maximum concentration detected = 592 mg/kg (sludge)

Table 3-1. (continued).

V-Tank Contaminant Chemicals (Chemical Abstract Service No., Vapor Density, and Ionization Energy)	Exposure Limit [a] (PEL/TLV/DAC)	Routes of Exposure [b]	Symptoms of Overexposure (Acute and Chronic)	Target Organs/ System	Labeled as a Carcinogen (Source[c,d])	Exposure Potential (All Routes without Regard to PPE)
Mercury (7439-97-6)	0.025 mg/m^3—TLV 0.1 mg/m^3 ceiling—PEL	Ih, Ig, Con, S	Eye and skin irritation, chest pain, breathing difficulty, tremor, insomnia, headache, fatigue, gastrointestinal disturbance, weight loss	Eyes, skin, respiratory system, CNS, kidneys	ACGIH—A4[c] IARC—3[c]	Low-moderate potential Maximum concentration detected = 2,110 mg/kg (sludge)
Nickel (7440-02-0)	1.5 mg/m^3, metal —TLV 0.2 mg/m^3, insoluble—TLV 0.1 mg/m^3, soluble—TLV 1 mg/m^3—PEL	Ih, Ig, Con	Sensitization dermatitis, allergic asthma, pneumonitis	Nasal cavities, lungs, skin	Insoluble: ACGIH—A1[c] IARC—1[c] NTP—R[c] Soluble: ACGIH—A4[c] IARC—1[c] NTP—R[c]	Low potential Maximum concentration detected = 435 mg/kg (sludge)
Silica (14808-60-7)	0.05 mg/m^3—TLV	Ih	Cough, difficulty breathing, decreased pulmonary function, irritated eyes	Eyes, respiratory system	ACGIH—A2 IARC—1 NTP—K[c]	Low potential
Tetrachloroethene (127-18-4)	25 ppm—TLV 100 ppm ceiling—TLV 100 ppm—PEL	Ih, Ig, Con, S	Eye, skin, nose, throat, respiratory irritant; nausea; dizziness; headache; drowsiness; red skin; liver damage	Eyes, skin, respiratory system, liver, kidneys, CNS	ACGIH—A3[c] IARC—2B[c] NTP—R[c]	Low potential Maximum concentration detected = 600 mg/kg (sludge)
1,1,1-Trichloroethane (71-55-6)	350 ppm – TLV 450 ppm Ceiling – TLV 350 ppm – PEL	Ih, Ig, Con	Eye and skin irritation, headache, weakness, CNS, depression, dermatitis, cardiac arrhythmias, liver damage	Eyes, skin, CNS, CVS, liver	ACGIH—A4[c] IARC—3[c]	Low-moderate potential Maximum concentration detected = 2,600 mg/kg (sludge)

Table 3-1. (continued).

V-Tank Contaminant Chemicals (Chemical Abstract Service No., Vapor Density, and Ionization Energy)	Exposure Limit [a] (PEL/TLV/DAC)	Routes of Exposure [b]	Symptoms of Overexposure (Acute and Chronic)	Target Organs/ System	Labeled as a Carcinogen (Source[c,d])	Exposure Potential (All Routes without Regard to PPE)
Trichloroethene (79-01-6)	50 ppm—TLV 100 ppm ceiling—TLV 100 ppm—PEL 200 ppm ceiling—PEL	Ih, Ig, Con, S	Eye and skin irritation, vertigo, fatigue, tremor, drowsiness, nausea, vomiting, dermatitis, cardiac arrhythmias, liver injury	Eyes, skin, respiratory system, heart, liver, kidneys, CNS	ACGIH—A5[c] IARC—3[c] NTP—R[c]	Moderate potential Maximum concentration detected = 22,000 mg/kg (sludge), 410 mg/L (liquid)
Hexachlorobenzene (118-74-1)	0.002 mg/m^3—TLV	Ih, Ig, Con, S	Eye and skin irritation, vertigo, fatigue, tremor, drowsiness, nausea, vomiting, dermatitis, cardiac arrhythmias, liver injury	Eyes, skin, respiratory system, heart, liver, kidneys, CNS	ACGIH—A3[c]	Low-moderate potential
Hexachlorobutadiene (87-68-3)	0.02 ppm—TLV	Ih, Ig, Con, S	Eye and skin irritation, vertigo, fatigue, tremor, drowsiness, nausea, vomiting, dermatitis, cardiac arrhythmias, liver injury	Eyes, skin, respiratory system, heart, liver, kidneys, CNS	ACGI—A3[c]	Low-moderate potential
Dinitrotoluene (25321-14-6)	0.2 mg/m^3—TLV	Ih, Ig, Con, S	Eye and skin irritation, vertigo, fatigue, tremor, drowsiness, nausea, vomiting, dermatitis, cardiac arrhythmias, liver injury	Eyes, skin, respiratory system, heart, liver, kidneys, CNS, reproductive	ACGIH—A3[c]	Low-moderate potential

Table 3-1. (continued).

V-Tank Contaminant Chemicals (Chemical Abstract Service No., Vapor Density, and Ionization Energy)	Exposure Limit [a] (PEL/TLV/DAC)	Routes of Exposure [b]	Symptoms of Overexposure (Acute and Chronic)	Target Organs/ System	Labeled as a Carcinogen (Source[c,d])	Exposure Potential (All Routes without Regard to PPE)
Radionuclides (whole body exposure) (Cs-137 dominant radioisotope)	In accordance with INEEL "Radiological Control Manual" (PRD-183)	Whole body	Acute: Gastrointestinal disorders, bacterial infections, hemorrhaging, anemia, loss of body fluids, cataracts, temporary sterility Chronic: Cancer, precancerous lesions, benign tumors, cataracts, skin changes, congenital defects	Blood-forming and rapidly dividing cells, gastrointestinal tract	Yes[d]	Low exposure potential Low levels detected in soil samples

a. *Threshold Limits Value Booklet* (ACGIH 2002) and OSHA 29 CFR 1910.1000 Table Z-1 and 2-2.

b. (Ih) inhalation; (Ig) ingestion; (S) skin absorption; (Con) contact hazard

c. ACGIH: A1 – Confirmed human carcinogen. A2 – Suspected human carcinogen. A3 – Confirmed animal carcinogen with unknown relevance to humans. A4 – Not classifiable as a human carcinogen (due to lack of data). A5 – Not suspected as a human carcinogen. IARC: 1 – Carcinogenic to humans. 2A – Probably carcinogenic to humans (adequate animal data, insufficient human data). 2B – Possibly carcinogenic to humans (insufficient human or animal data). 3 – Not classifiable as to carcinogenicity to humans. 4 – Probably not carcinogenic to humans. NTP: K – Known to be a carcinogen. R – Reasonably anticipated to be a carcinogen (limited evidence in human studies).

d. International Council on Radiation Protection

CNS = central nervous system
DAC = derived air concentration
PEL = permissible exposure limit
PPE = personal protective equipment
ppm = parts per million
PRD = program requirements document
TLV = threshold limit value
TWA = time-weighted average
Material safety data sheets for these chemicals are available on the INEEL Internet.

3.1.1 Routes of Exposure

Exposure pathways exist for various hazardous materials and radionuclides at the project site. Engineering controls, monitoring, training, and work controls will mitigate potential contact and uptake of these hazards. However, the potential for exposure to contaminants still exists. Exposure pathways include those listed below:

- **Inhalation** is possible during work. Airborne contaminants may be inhaled and deposited in the respiratory tract.

- **Skin absorption and contact** is possible during work. This can cause corrosion resulting in chemicals burns, uptake through skin absorption, and skin contamination.

- **Ingestion** is possible during work. Uptake of contaminants through the gastrointestinal tract could result in effects such as gastrointestinal irritation, internal tissue irradiation, and deposition to target organs.

- **Injection** while handling hazardous materials by breaking of the skin or migration through an existing wound can result in localized irritation, contamination, uptake of soluble contaminants, and deposition of insoluble contaminants.

Chemical and radiological hazards will be eliminated, isolated, or mitigated to the extent possible during all project tasks. Where they cannot be eliminated or isolated, monitoring for chemical and radiological hazards will be conducted (as described in Section 4) to detect and quantify exposures. Additionally, administrative controls, training, work processes, and protective equipment will be used to further reduce the likelihood of exposure to these hazards. Table 3-2 summarizes each primary project task, associated hazards, and mitigation processes.

3.2 Safety, Physical Hazards, and Mitigation

Industrial safety and physical hazards will be encountered while performing work at the project site. Section 5.2 provides general safe-work practices that must be followed at all times. The following sections describe specific industrial safety hazards and procedures to be followed to eliminate or minimize potential hazards to project personnel.

3.2.1 Material Handling and Back Strain

Material handling and maneuvering of various pieces of equipment could result in employee injury. All lifting and material-handling tasks will be performed in accordance with Management Control Procedure (MCP) -2692, “Ergonomics Program.” Personnel will not physically lift objects weighing more than 22 kg (50 lb) or 33% of their body weight (whichever is less) alone. Additionally, back strain and ergonomic considerations must be given to material handling and equipment usage. Mechanical and hydraulic lifting devices should be used to move materials whenever possible. The industrial hygienist will conduct ergonomic evaluations of various project tasks to determine the potential ergonomic hazards and provide recommendations to mitigate these hazards. Applicable requirements from Program Requirements Document (PRD) -2016 or MCP-2739, “Material Handling, Storage, and Disposal,” will also be followed. Table 3-2 is a summary of activities, associated hazards, and mitigation concerns at TSF-46, TSF-47, and TSF-48.

Table 3-2. Summary of activities, associated hazards, and mitigation concerns at TSF-46, TSF-47, and TSF-48.

Activity or Task	Associated Hazards or Hazardous Agent	Hazard Mitigation
Mobilization, Site Preparation, and Earthwork (All support equipment)	Radiological contamination—subsurface soils Radiation exposure	Radiological control technician surveys, dosimetry, direct-reading instruments, and compliance with posted entry and exit requirements to project areas
	Chemical contaminants—subsurface soil	Controlled areas, qualified operators, JSAs, TPRs, or work packages
	Equipment movement and vehicle traffic—trailers, drill rig, pinch points; ergonomic concerns; and struck-by or caught-between potential.	Trained operators, JSAs, SWPs, TPRs, qualified heavy equipment operator (hoisting and rigging), designated traffic lanes and areas, watch body position, and wear PPE
	Hazards associated with excavation pits and trenches	Sloping or benching and daily inspections (minimum) of excavation and areas adjacent to the excavation by competent person
	Lifting and back strain	Mechanical equipment movement, proper lifting techniques, and two-person lifts
	Subsidence of soil from heavy equipment	Inspect areas before driving equipment on pit surfaces.
	Heat and cold stress	Industrial hygienist or FTL monitoring and work-rest cycles as required
	Noise	Industrial hygienist or FTL monitoring and proper use of hearing protective devices
	Tripping hazards and working-walking surfaces—ice- and snow-covered surfaces and drill rig truck deck and ladders	Salt and sand icy areas. Use nonskid or high-friction materials on walking surfaces.
	Stored energy sources—electrical lines and panels, overhead obstructions, hoisting and rigging, gas cylinders	Identify and mark all utilities; ensure that all lines and cords are checked for damage and continuity; use ground-fault circuit interrupter on outdoor equipment; comply with minimum clearances for overhead lines; and secure cylinders, caps, and bottles before movement.

Table 3-2. (continued).

Activity or Task	Associated Hazards or Hazardous Agent	Hazard Mitigation
Sampling and Drilling	Radiological contamination and radiation exposure	Radiological control technician surveys, RWP (as required), dosimetry, direct-reading instruments; comply with posted entry and exit requirements to project areas.
	Chemical—subsurface soils	Controlled areas, qualified operators, JSAs, SWP, TPRs, or work package.
	Equipment movement and vehicle traffic—pinch points, struck-by or caught-between potential, drill rig	Trained operators, JSAs, SWPs, TPRs, qualified heavy equipment operator (hoisting and rigging), designated traffic lanes and areas; watch body position; wear PPE.
	Lifting and back strain, ergonomic concerns.	Proper lifting techniques, two-person lifts (as required)
	Heat and cold stress	Industrial hygienist or FTL monitoring and work-rest cycles (as required)
	Tripping hazards and working-walking surfaces—existing probes in the ground and ice- and snow-covered surfaces	Awareness of probe locations, salt and sand icy areas, and use nonskid or high-friction footwear on walking surfaces.

FTL = field team leader
JSA = job safety analysis
PPE = personal protective equipment
RWP = radiological work permit
SWP = safe work permit
TPR = technical procedure

3.2.2 Repetitive Motion and Musculoskeletal Disorders

Physical tasks to be conducted could expose personnel to repetitive-motion hazards, undue physical stress, overexertion, awkward postures, or other ergonomic risk factors that could lead to musculoskeletal disorders. Musculoskeletal disorders can cause a number of conditions, including pain, numbness, tingling, stiff joints, difficulty moving, muscle loss, and sometimes paralysis. The assigned project industrial hygienist will evaluate project tasks and provide recommendations to reduce the potential for musculoskeletal disorders in accordance with MCP-2692, "Ergonomics Program."

3.2.3 Working and Walking Surfaces

Slippery work surfaces can increase the likelihood of back injuries, overexertion injuries, slips, and falls. The remediation and field sampling activities at TSF-46, TSF-47, and TSF-48 presents inherent tripping hazards. During the prejob briefing, all personnel will be made aware of tripping hazards that cannot be eliminated. Tripping and slip hazards will be evaluated during the course of the project in accordance with PRD-2005 or PRD-5103, "Walking and Working Surfaces."

3.2.4 Powered Equipment and Tools

Powered equipment and tools present potential physical hazards (e.g., pinch points, electrical hazards, flying debris, struck-by, and caught-between) to personnel operating them. All portable equipment and tools will be properly maintained and used by qualified individuals and in accordance with the manufacturer's specifications. At no time will safety guards be removed. Requirements from PRD-2015, "Hand and Portable Power Tools," or PRD-5101, "Portable Equipment and Handheld Power Tools," will be followed for all work performed with powered equipment, including hand tools. All tools will be inspected by the user before use.

3.2.5 Electrical Hazards and Energized Systems

Electrical equipment and tools, as well as overhead and underground lines associated with the V-Tank Area New Sites remediation and sampling, could pose shock or electrocution hazards to personnel. Safety-related work practices will be employed to prevent electric shock or other injuries resulting from direct or indirect electrical contact. If work on energized systems is necessary, these practices will conform to the requirements in PRD-2011 or PRD-5099, "Electrical Safety"; MCP-3650, "Chapter IX—Level I Lockout and Tagouts"; MCP-3651, "Chapter IX—Level II Lockouts and Tagouts"; PRD-2012, "Lockouts and Tagouts"; and Parts I through III of National Fire Protection Association (NFPA) 70E, "Standard for Electrical Safety Requirements for Employee Workplaces." In addition, all electrical work will be reviewed and completed under the appropriate work controls (e.g., technical procedures [TPRs] and work orders). When working around overhead lines, clearances will be maintained at all times. Additionally, all underground utilities and installations will be identified before conducting excavation activities in accordance with PRD-2014, "Excavation and Surface Penetrations."

3.2.5.1 Combustible Materials. Combustible or ignitable materials in contact with or near exhaust manifolds, catalytic converters, or other ignition sources could result in a fire. A fire protection engineer should be contacted if questions arise about potential ignition sources. The accumulation of combustible materials will be strictly controlled. Disposal of combustible materials will be assessed at the end of each shift. Class A combustibles such as trash, cardboard, rags, wood, and plastic will be properly disposed of in appropriate waste containers. The fire protection engineer also may conduct periodic site inspections to ensure that all fire protection requirements are being met.

3.2.5.2 Flammable and Combustible Liquids. Fuel used at the site for fueling must be safely stored, handled, and used. Only flammable liquid containers approved by the Factory Mutual and Underwriters Laboratories, and labeled with the contents, will be used to store fuel. All fuel containers will be stored at least 15 m (50 ft) from any facilities and ignition sources or they will be stored inside an approved flammable storage cabinet. Additional requirements are provided in PRD-2201, "Flammable and Combustible Liquid Storage," or PRD-308, "Handling and Use of Flammable and Combustible Liquids." Portable motorized equipment (e.g., generators and light plants) will be shut off and allowed to cool down in accordance with the manufacturer's operating instructions before being refueled to minimize the potential for a fuel fire.

3.2.6 Pressurized Systems

The hazards presented to personnel, equipment, facilities, or the environment because of inadequately designed or improperly operated pressure (or vacuum) systems include blast effects, shrapnel, fluid jets, release of toxic or asphyxiant materials, contamination, equipment damage, personnel injury, and death. These systems can include pneumatic, hydraulic, vacuum, or compressed gas systems. The requirements of PRD-2009, "Compressed Gases"; or PRD-5040, "Handling and Use of Compressed Gases"; PRD-5, "Boilers and Unfired Pressure Vessels"; and the manufacturer's operating and maintenance instructions must be followed. This includes inspection, maintenance, and testing of systems and components in conformance with American National Standards Institute (ANSI) requirements.

All pressure systems will be operated in the designed operating pressure range, which is typically 10 to 20% less than the maximum allowable working pressure. Additionally, all hoses, fittings, lines, gauges, and system components will be rated for the system for at least the maximum allowable working pressure (generally the relief set point). The project safety professional should be consulted about any questions of pressure systems in use at the project site.

3.2.7 Cryogenics

All cryogenic tasks will be conducted and protective equipment worn in accordance with PRD-5038, "Cryogenic Systems." Personal protective equipment will be worn at all times when handling, transferring, or dispensing cryogenic liquids in accordance with PRD-5038.

3.2.8 Heavy Equipment and Moving Machinery

Hazards associated with the operation of heavy equipment include injury to personnel (e.g., struck-by and caught-between hazards) and equipment and property damage. All heavy equipment will be operated in the manner in which it was intended and in accordance with the manufacturer's instructions. Only authorized, qualified personnel will be allowed to operate equipment, and personnel near operating heavy equipment must maintain visual communication with the operator. Personnel will comply with PRD-2020 or MCP-2745, "Heavy Industrial Vehicles," and PRD-2019 or PRD-5123, "Motor Vehicle Safety." Personnel working around or near cranes or boom trucks will also comply with PRD-600, "Hoisting and Rigging."

Additional safe practices will include the following:

- All heavy equipment will have backup alarms.

- Walking directly behind or to the side of heavy equipment without the operator's knowledge is prohibited. All precautions will be taken before moving heavy equipment.

- While operating heavy equipment in the work area, the equipment operator will maintain communication with a designated person who will be responsible for providing direct voice contact or approved standard hand signals. In addition, all facility personnel in the immediate work area will be made aware of the equipment operations.

- All equipment will be kept out of traffic lanes and access ways and will be stored so as not to endanger personnel at any time.

- All unattended equipment will have appropriate reflectors or be barricaded if left on roadways.

- Employees exposed to vehicular/equipment traffic will be provided with, and will wear, warning vests or other suitable garments marked with or made of reflecting or high-visibility material.

- All parked equipment will have the parking brake set. Chocks will be used when equipment is parked on inclines.

- The swing radius of heavy equipment will be adequately barricaded or marked to prevent personnel from entering into the swing radius.

3.2.9 Excavation, Surface Penetrations, and Outages

Excavation activities will be conducted in conjunction with this project. All surface penetrations with the exception of certain soil sampling activities and related outages will be coordinated through the TAN Utilities and will require submittal of an outage request (i.e., Form 433.1, "Outage Request") for outages (e.g., road, electrical, and water). The submission of an outage request will not be considered an approval to start the work. Other specific outage requirements are addressed in the special conditions section of the management and operating contract. No surface penetrations will be allowed or conducted until the area has been evaluated and an approved subsurface evaluation documented.

All excavation activities will be conducted and monitored in accordance with PRD-2014 or PRD-22, "Excavation and Surface Penetrations," and 29 CFR 1926, Subpart P, "Excavations." The following are some key elements from these requirements:

- The location of utility installations (e.g., sewer, telephone, fuel, electric, water lines, or any other underground installations) that could possibly be encountered during excavation work will be determined before opening an excavation.

- Lockout/tagout procedures will be used, as necessary.

- Structural ramps that are used solely by employees as a means of access or egress from excavations will be designed by a competent person. Structural ramps used for access or egress of equipment will be designed by a competent person qualified in structural design and will be constructed in accordance with the design. Structural ramps will be inspected in accordance with Form 432.57, "Excavation Checklist."

- Daily inspections of excavations, areas adjacent to the excavations, and protective systems will be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection will be conducted by the competent person before the start of work and as needed throughout the shift. Inspections also will be made after every rainstorm or other hazard-increasing occurrence.

- Sloping or benching will be constructed and maintained in accordance with the requirements set forth in 29 CFR 1926, Subpart B, Appendix B, for the soil type as classified by the competent person. This classification of the soil deposits will be made based on the results of at least one visual inspection and at least one manual analysis.

3.2.9.1 Drilling Hazards. Soil boring (drilling) will be used at the project site to penetrate to the required depth to collect core samples. Drilling personnel will be aware of potential drilling equipment hazards and body positioning during all material handling tasks. Specific hazards associated with drill rigs are described in the following subsections.

3.2.9.1.1 Slips (Toothed Wedges)—Slips are toothed wedges positioned between the drill pipe and the master bushing or rotary cable to suspend the drill string in the well bore when it is not supported by the hoist. Most accidents associated with slip operations are related to manual material handling. Strained backs and shoulders are common.

3.2.9.1.2 Tongs—Tongs are large, counter-weighted wrenches used to break apart torqued couplings on the drill pipe. Both sets of tongs have safety lines; when breakout force is applied to the tongs, the tongs or the safety lines could break and injure a worker standing near them. Accidents can occur when the driller activates the wrong tong lever and an unsecured tong swings across the rig floor at an uncontrolled velocity. A common accident attributable to tongs can occur when a worker has a hand or finger in the wrong place in attempting to swing and latch the tong onto the drill pipe, resulting in crushing injuries to, or amputation of, the fingers.

3.2.9.1.3 Elevators—Elevators are a set of clamps affixed to the bails on the swivel below the traveling block. They are clamped to each side of a drill pipe and hold the pipe as it is pulled from the well bore. Accidents and injuries can occur during the latching and unlatching tasks; fingers and hands can be caught and crushed in the elevator latch mechanism. If the pipe is overhead when the latching mechanism fails, the pipe could fall on workers working on the drill floor.

3.2.9.1.4 Catlines—Catlines are used on drilling rigs to hoist material. Accidents that occur during catline operations could injure the worker doing the rigging as well as the operator. Minimal control over hoisting materials can cause sudden and erratic load movements, which could result in hand and foot injuries.

3.2.9.1.5 Working Surfaces—The rig floor is the working surface for most tasks performed in well drilling operations. The surface is frequently wet from circulating fluid, muddy cuttings, and water used or removed from the borehole during drilling operations. Slippery work surfaces can increase the likelihood of back injuries, overexertion injuries, slips, and falls.

3.2.9.1.6 High-Pressure Lines—A high-pressure diversion system will be used to carry cuttings away from the borehole. All high-pressure lines will be secured with properly rated whip checks in the event of a connection failure. The project safety professional will be consulted about the rating and proper placements of whip checks or equivalent restraining devices.

3.2.9.2 Material Handling. The most common type of accident that occurs during material handling is when a load is being handled and a finger or toe is caught between two objects. Rolling stock can shift or fall from a pipe rack or truck bed. Fingers and hands can be caught between sampling barrels, breakout vices, and tools.

3.2.10 Overhead Objects

Personnel may be exposed to falling overhead objects, debris, or equipment or impact hazards during the course of the project. Where there is a potential for falling debris, overhead impact hazards will be marked by using engineering-control protective systems, and head protection PPE will be worn. Sources for these hazards will be identified and mitigated in accordance with PRD-2005 or PRD-5103, “Walking and Working Surfaces.”

3.2.11 Personal Protective Equipment

Wearing PPE will reduce a worker'’ ability to move freely, see clearly, and hear directions and noise that might indicate a hazard. In addition, PPE can increase the risk of heat stress. Work activities at the task site will be modified as necessary to ensure that personnel are able to work safely in the required PPE. Work-site personnel will comply with PRD-2001 or PRD-5121, “Personal Protective Equipment,” and MCP-432, “Radiological Personal Protective Equipment.” All personnel who wear PPE will be trained in its use and limitations in accordance with PRD-2001 or PRD-5121.

3.2.12 Decontamination

Decontamination procedures for personnel and equipment are detailed in Section 12. Potential hazards to personnel conducting decontamination tasks include back strain; slip, trip, and fall hazards; and cross-contamination from contaminated surfaces. Additionally, electrical hazards might be present if powered equipment (e.g., a powered pressure washer) is used. Mitigation of these walking-working surfaces and electrical hazards is addressed in other prior subsections. If a power washer or heated power washer is used, units will be operated in accordance with manufacturer’s operating instructions. Personnel will wear appropriate PPE to prevent high-pressure spray injuries, use ground-fault circuit protection, and will conduct these tasks only in approved areas. Personnel will wear required PPE at all times during decontamination tasks, as listed in Section 6.

3.3 Environmental Hazards and Mitigation

Potential environmental hazards will present potential hazards to personnel during project tasks. These hazards will be identified and mitigated to the extent possible. This section describes these environmental hazards and states what procedures and work practices will be followed to mitigate them.

3.3.1 Noise

Personnel involved in project activities might be exposed to noise levels that exceed 85 decibel A-weighted (dBA) for an 8-hour time-weighted average (TWA) or 83 dBA for a 10-hour TWA. The effects of high sound levels (noise) may include the following:

- Personnel being startled, distracted, or fatigued
- Physical damage to the ear, pain, and temporary or permanent hearing loss
- Interference with communication that would warn of danger.

Where noise levels are suspected of exceeding 80 dBA, noise measurements will be performed in accordance with PRD-2108, “Hearing Conservation,” or MCP-2720, “Controlling and Monitoring Exposures to Noise,” to determine if personnel are routinely exposed to noise levels in excess of the applicable TWA (85 dBA for 8 hours of exposure or 83 dBA for 10-hour exposures).

Personnel whose noise exposure routinely meets or exceeds the allowable TWA will be enrolled in the INEEL Occupational Medical Program (OMP) or subcontractor hearing conservation program as applicable. Personnel working on jobs that have noise exposures greater than 85 dBA (84 dBA for a 10-hour TWA) will be required to wear hearing protection until noise levels have been evaluated and will continue to wear the hearing protection specified by the industrial hygienist until directed otherwise. Hearing protection devices will be selected and worn in accordance with PRD-2108.

3.3.2 Dust

Dust might be generated during excavation and sampling activities. Dust particulates could contain radiological contamination and other hazardous substances present at the task site. Precautions such as water spray, soil pile covers, wind monitoring, and visual observations will be used to prevent the generation of fugitive dust. Air monitoring requirements will be specified by a radiological control engineer and a certified industrial hygienist. Wind monitoring and visual observations to control fugitive dust will be performed by the industrial hygienist (IH) or site HSO. Personal protective equipment, when required, will be used as specified by the industrial hygienist present at the job site.

3.3.3 Temperature and Ultraviolet Light Hazards

Construction or project tasks will be conducted during times when there is a potential for heat or cold stress that could present a potential hazard to personnel. The industrial hygienist and HSO will be responsible for obtaining meteorological information to determine if additional heat or cold stress administrative controls are required. All project personnel must understand the hazards associated with heat and cold stress and take preventive measures to minimize the effects. The guidelines in MCP-2704, “Heat and Cold Stress,” will be followed when determining work-rest schedules or halt work activities because of temperature extremes.

3.3.3.1 Heat Stress. High ambient air temperatures can result in increased body temperature, heat fatigue, heat exhaustion, or heat stroke that can lead to symptoms ranging from physical discomfort, unconsciousness, to death. In addition, tasks requiring the use of protective equipment or respiratory protection prevent the body from cooling. Personnel must inform the field team leader (FTL) or HSO when experiencing any signs or symptoms of heat stress or when observing a fellow employee (i.e., buddy) experiencing them. Heat stress stay times will be documented on the appropriate work control document(s) (i.e., a safe work permit [SWP], prejob briefing form, or other) by the HSO in conjunction with the IH, as required, when personnel wear PPE that could increase heat body burden. These stay times will take into account the amount of time spent on a task, the nature of the work (i.e., light, moderate, or heavy), type of PPE worn, and ambient work temperatures. Table 3-3 lists heat stress signs and symptoms of exposure.

Table 3-3. Heat stress signs and symptoms of exposure.

Heat-Related Illness	Signs and Symptoms	Emergency Care
Heat rash	Red skin rash and reduced sweating	Keep the skin clean. Change all clothing daily. Cover affected areas with powder containing cornstarch or with plain cornstarch.
Heat cramps	Severe muscle cramps and exhaustion, sometimes with dizziness or periods of faintness	Move the patient to a nearby cool place. Give the patient half-strength electrolytic fluids. If cramps persist, or if signs that are more serious develop, seek medical attention.
Heat exhaustion	Rapid, shallow breathing; weak pulse; cold, clammy skin; heavy perspiration; total body weakness; dizziness that sometimes leads to unconsciousness	Move the patient to a nearby cool place. Keep the patient at rest and supply half-strength electrolytic fluids. Treat for shock. Seek medical attention. DO NOT TRY TO ADMINISTER FLUIDS TO AN UNCONSCIOUS PATIENT.
Heat stroke	Deep, then shallow, breathing; rapid, strong pulse, then rapid, weak pulse; dry, hot skin; dilated pupils; loss of consciousness (possible coma); seizures or muscular twitching	Cool the patient rapidly. Treat for shock. If cold packs or ice bags are available, wrap them and place one bag or pack under each armpit, behind each knee, one in the groin, one on each wrist and ankle, and one on each side of the neck. Seek medical attention as rapidly as possible. Monitor the patient's vital signs constantly. DO NOT ADMINISTER FLUIDS OF ANY KIND.

NOTE: Heat exhaustion and heat stroke are extremely serious conditions that can result in death and should be treated as such. The FTL or designee should immediately request an ambulance (777 or 526-1515) be dispatched from TAN (777 or 526-6263) or Central Facilities Area (CFA) -1612 medical facility. The individual should be cooled as described in Table 3-3 based on the nature of the heat stress illness.

3.3.3.2 Low Temperatures and Cold Stress. Personnel will be exposed to low temperatures during fall and winter months or at other times of the year if relatively cool ambient temperatures combined with wet or windy conditions exist. Additional cold weather hazards might exist from working on snow- or ice-covered surfaces. Slip, fall, and material-handling hazards are increased under these conditions. Every effort must be made to ensure that walking surfaces are kept clear of ice. The FTL or HSO should be notified immediately if slip or fall hazards are identified at the project locations.

3.3.3.3 Ultraviolet Light Exposure. Personnel will be exposed to ultraviolet (UV) light (i.e., sunlight) when conducting project tasks. Sunlight is the main source of UV known to damage the skin and cause skin cancer. The amount of UV exposure depends on the strength of the light, the length of exposure, and whether the skin is protected. No UV rays or suntans are safe. The following are mitigative actions that may be taken to minimize UV exposure:

- Wear clothing to cover the skin (long pants [no shorts] and long sleeve or short sleeve shirts [no tank tops])

- Use a sunscreen with a sun protection factor of at least 15

- Wear a hat (hard hat where required)
- Wear UV-absorbing safety glasses
- Limit exposure during peak intensity hours of 10 a.m. to 4 p.m. whenever possible.

3.3.4 Inclement Weather Conditions

When inclement or adverse weather conditions develop that could pose a threat to persons or property at the project site (e.g., sustained strong winds 25 mph or greater, electrical storms, heavy precipitation, or extreme heat or cold), conditions will be evaluated and a decision made by the HSO with input from other personnel to halt work, employ compensatory measures, or proceed. The FTL and HSO will comply with INEEL MCPs and facility work control documents that specify limits for inclement weather.

3.3.5 Subsidence

Personnel might be exposed to subsidence hazards during project activities. This is primarily an equipment hazard when driving or operating equipment in subsidence areas; however, personnel also may be at risk from walking in these areas. Where required, personnel will not enter potential subsidence areas until they obtain clearance from the area supervisor or facility shift supervisor. Barriers and postings for potential subsidence areas will be observed at all times.

3.3.6 Biological Hazards

The INEEL is located in an area that provides habitat for various rodents, insects, and vectors (i.e., organisms that carry disease-causing microorganisms from one host to another). The potential exists for encountering nesting materials or other biological hazards and vectors. The hantavirus might be present in the nesting and fecal matter of deer mice. If such materials are disturbed, they can become airborne and create a potential inhalation pathway for the virus. Contact and improper removal of these materials could provide additional inhalation exposure risks.

If suspected rodent nesting or excrement material is encountered, the industrial hygienist will be notified immediately and **no attempt will be made to remove or clean the area**. Following an evaluation of the area, disinfection and removal of such material will be conducted in accordance with MCP-2750, "Preventing Hantavirus Infection."

Snakes, insects, and arachnids (e.g., spiders, ticks, and mosquitoes) also might be encountered. Common areas to avoid include material stacking and staging areas, under existing structures (e.g., trailers and buildings), under boxes, and other areas that provide shelter. Protective clothing will generally prevent insects from coming into direct contact with the skin. If potentially dangerous snakes or spiders are found or are suspected of being present, warn others, keep clear, and contact the industrial hygienist or HSO for additional guidance as required.

Insect repellant (DEET or equivalent) might be required. Areas where standing water has accumulated (e.g., evaporation ponds) provide breeding grounds for mosquitoes and should be avoided. In cases where a large area of standing water is encountered, it may be necessary to pump the water out of the declivity (areas other than the evaporation ponds).

3.3.7 Confined Spaces

Work in confined spaces may subject personnel to risks involving engulfment, entrapment, oxygen deficiency, and toxic or explosive atmospheres. Confined spaces may be identified at the project site. If entry into a confined space is required, then all requirements of MCP-2749 or PRD-2110, “Confined Spaces,” will be followed.

3.4 Other Task-Site Hazards

Task-site personnel should continually look for potential hazards and immediately inform the FTL or HSO of the hazards so that action can be taken to correct the condition. All personnel have the authority to initiate STOP WORK actions in accordance with PRD-1004 or MCP-553, “Stop Work Authority,” if it is perceived that an imminent safety or health hazard exists or to take corrective actions within the scope of the work control authorization documents to correct minor safety of health hazards and then inform the FTL.

Personnel working at the task site are responsible for using safe-work practices, reporting unsafe working conditions or acts, and exercising good housekeeping habits with respect to tools, equipment, and waste throughout the course of the project.

3.5 Site Inspections

Project personnel may participate in site inspections during the work control preparation stage (such as the hazard identification and verification walk-downs) and may conduct self-assessments or other inspections. Additionally, periodic safety inspections may be performed by the HSO, project manager, or FTL in accordance with MCP-3449, “Safety and Health Inspections,” or PRD-1006, “Safety Surveillance.”

Targeted or required self-assessments may be performed during investigation and sampling operations in accordance with MCP-8, “Performing Management Assessments and Management Reviews.” All inspections and assessments will be documented and available for review by the FTL. These inspections will be noted in the FTL or construction engineer logbook. Health and safety professionals present at the task site may, at any time, recommend changes in work habits to the FTL. However, all changes that could affect the work control documents must have concurrence from the appropriate project technical representatives.

4. EXPOSURE MONITORING AND SAMPLING

A potential for exposure to radiological, chemical, and physical hazards exists during project tasks and could affect all personnel. Refinement of work control zones (Section 8), use of engineering and administrative controls, worker training, and wearing PPE provides the mitigation strategy for these hazards. Monitoring and sampling will be used during project tasks to (1) assess the effectiveness of these controls, (2) determine the type of PPE needed for individual tasks, and (3) determine the need for upgrading and downgrading of PPE, as described in Section 6. Monitoring will be conducted in and around the active work location on a periodic basis and as determined based on site-specific conditions.

Table 4-1 lists the tasks and hazards that may be monitored, the frequency, and the monitoring instruments. Table 4-2 lists the action levels and associated responses for specific hazards.

4.1 Exposure Limits

Exposure limits identified in Table 3-1 serve as the initial action limits for specific project tasks. Project tasks will be continually assessed in accordance with PRD-25, "Activity Level Hazard Identification, Analysis, and Control," and evaluated by Radiological Control and Industrial Hygiene personnel to ensure engineering control effectiveness. Action limits should be adjusted as required based on changing site conditions, exposure mitigation practices, and PPE levels.

4.2 Environmental and Personnel Monitoring

Industrial Hygiene and Radiological Control (RadCon) personnel will conduct periodic monitoring with direct-reading instrumentation, collect swipes, and conduct full- and partial-period air sampling, as deemed appropriate and in accordance with the applicable MCPs, OSHA substance-specific standards, and as stated on the radiological work permit (RWP). Instrumentation listed on Table 4-1 will be selected based on the site-specific conditions and contaminants associated with project tasks. The radiological control technician (RCT) and IH will be responsible for determining the best monitoring technique for radiological and nonradiological contaminants, respectively. Safety hazards and other physical hazards will be monitored and mitigated as outlined in Section 3.

4.2.1 Industrial Hygiene Area and Personal Monitoring and Instrument Calibration

The project industrial hygienist will conduct full- and partial-period sampling of airborne contaminants and monitoring of physical agents at a frequency deemed appropriate based on direct-reading instrument readings and changing site conditions. All air sampling will be conducted using applicable National Institute of Occupational Safety and Health (NIOSH), OSHA, or other validated method. Both personal and area sampling and monitoring may be performed.

Various direct-reading instruments may be used to determine the presence of nonradiological and other physical agents. The frequency and type of sampling and monitoring will be determined by changing site conditions, direct-reading instrument results, observation, professional judgment, and in accordance with the MCP-153, "Industrial Hygiene Exposure Assessment."

All monitoring instruments will be maintained and calibrated in accordance with the manufacturer's recommendations, existing Industrial Hygiene protocol, and in conformance with the companywide safety and health manuals (*Manual 14A—Safety and Health—Occupational Safety and Fire Protection* and *Manual 14B—Safety and Health—Occupational Medical and Industrial Hygiene)*. Direct-reading instruments will be calibrated, at a minimum, before daily use and more frequently as

Table 4-1. Tasks and hazards that may be monitored, frequency, and monitoring instruments.

Tasks	Hazard(s) to be Monitored	Instrument Category to be Used	Instrument Category #	Monitoring Instruments Description[a,b]
Soil drilling and sampling	Ionizing radiation—(alpha, beta, gamma)	1	1	(Alpha) Count rate—Bicron/NE Electra (DP-6 or AP-5 probe) or equivalent Stationary—Eberline RM-25 (HP-380AB or HP-380A probe) or equivalent
	Radionuclide contamination—(alpha, beta, gamma)	2		
	Chemical constituents—organic vapors, lead, cadmium	3, 4		(Beta-gamma) Count rate—Bicron NE/Electra (DP-6, BP-17 probes) or equivalent Stationary—Eberline RM-25 (HP-360AB probe) or equivalent
	Respirable dust—silica (area and personal)	3, 5		
	Hazardous noise	6	2	CAM—ALPHA 6-A-1 (in-line and radial sample heads, pump, RS-485) or equivalent (as required) CAM (beta)—AMS-4 (in-line and radial head, pump RS-485) or equivalent (as required) Grab sampler—SAIC H-810 or equivalent
	Ergonomics, repetitive motion, lifting	7		
	Heat and cold stress	8		
	Hazardous noise	6		
	Ergonomics, repetitive motion, lifting	7		
Decontamination of equipment	Radionuclide contamination—(alpha, beta, gamma)	2		
	Chemical constituents—organic vapors, lead, cadmium	3, 4	7	Observation and ergonomic assessment of activities in accordance with MCP-2692, "Ergonomics Program," and American Conference of Governmental Industrial Hygienists threshold limit value.
	Hazardous noise	6	8	Heat stress—wet-bulb globe temperature, body weight, fluid intake
	Ergonomics, repetitive motion, lifting	7		
	Heat and cold stress	8		Cold stress—ambient air temperature, wind chill charts

a. Monitoring and sampling will be conducted as deemed appropriate by project Industrial Hygiene and Radiological Control personnel based on specific tasks and site conditions.
b. Equivalent instrumentation other than those listed may be used.
CAM =c ontinuous air monitor
MCP = management control procedure

Table 4-2. Action levels and associated responses for hazards.

<table>
<tr><th>Contaminant/Agent Monitored</th><th colspan="2">Action Level</th><th colspan="2">Response Taken If Action Levels Are Exceeded</th></tr>
<tr><td>Nuisance particulates (not otherwise classified)</td><td colspan="2">>10 mg/m^3 (inhalable fraction)
>3 mg/m^3 (respirable fraction)</td><td colspan="2">Move personnel to upwind position of source and close equipment cab windows and doors.
Use wetting or misting methods to minimize dust and particulate matter.
IF wetting or misting methods prove ineffective,
THEN don respiratory protection[a] (as directed by industrial hygienist).</td></tr>
<tr><td>Silica (respirable fraction)</td><td colspan="2">Greater than or equal to the Occupational Safety and Health Administration permissible exposure limit of
$\frac{10\ mg/m^3}{\%silica + 2}$
(29 CFR 1910.1000 [Z3])</td><td colspan="2">Move personnel to upwind position of source.
Use wetting or misting methods to minimize dust and particulate matter during mixing.
IF wetting or misting methods prove ineffective,
THEN don respiratory protection[a] (as directed by industrial hygienist).</td></tr>
<tr><td rowspan="3">Hazardous noise levels</td><td colspan="2"><85 dBA 8-hr TWA, <83 dBA 10-hr TWA</td><td colspan="2">No action</td></tr>
<tr><td colspan="2">85 to 114 dBA</td><td colspan="2">Hearing protection is required to attenuate hazard to below 85 dBA 8-hr TWA or 83 dBA for 10-hr TWA (device noise reduction rating).</td></tr>
<tr><td>(a) >115 dBA</td><td>(b) >140 dBA</td><td>(a) Isolate source, evaluate the noise reduction rating for single device, double protection as needed.</td><td>(b) Control entry, isolate source, only approved double protection worn.</td></tr>
<tr><td rowspan="3">Radiation field</td><td colspan="2"><5 mrem/h</td><td colspan="2">No action, no posting required.</td></tr>
<tr><td colspan="2">5 to 100 mrem/h @ 30 cm
(10 CFR 835.603b)</td><td colspan="2">Post as “Radiation Area”—Required items: Radiological Worker I or II training, RWP, personal dosimetry.</td></tr>
<tr><td colspan="2">>100 mrem to
500 Rad @ 100 cm
(10 CFR 835.603b)</td><td colspan="2">Post as “High Radiation Area”—Required items: RW II, RWP, alarming personal dosimetry, dose rate meter, and temporary shielding (as required).</td></tr>
</table>

Table 4-2. (continued).

Contaminant/Agent Monitored	Action Level	Response Taken If Action Levels Are Exceeded
Radionuclide contamination	1 to 100 times "Radiological Control Manual"[b] Table 2-2 values (10 CFR 835.603d)	Post as "Contamination Area"—Required items: RW II training, personal dosimetry, RWP, don PPE, bioassay submittal (as required).
	>100 times "Radiological Control Manual"[b] Table 2-2 values (10 CFR 835.603d)	Post as "High Contamination Area"—Required items: RW II training, personal dosimetry, RWP (with prejob briefing), don PPE, bioassay submittal (as required).
Airborne radioactivity	Concentrations (μCi/cc) >30% of the derived air concentration value (10 CFR 835.603d)	Post as "Airborne Radioactivity Area"—Required items: RW II training, personal dosimetry, RWP (with prejob briefing), don PPE, bioassay submittal (as required).

a. Level C respiratory protection will consist of a full-face respirator equipped with a high-efficiency particulate air filter cartridge as prescribed by the project Industrial Hygiene and Radiological Control personnel (based on contaminant of concern). See Section 6 for additional Level C requirements.
b. PRD-183, "Radiological Control Manual"
CFR = Code of Federal Regulations
dBA = decibel A-weighted
PRD = program requirements document
RWP = radiological work permit
TWA = time-weighted average

determined by the project industrial hygienist. Calibration information, sampling and monitoring data, results from direct-reading instruments, and field observations will be recorded as stated in Section 13.

4.2.2 Area Radiological Monitoring and Instrument Calibration

Area radiological monitoring will be conducted during project tasks to ensure that personnel are given adequate protection from potential radiological exposure. Instruments and sampling methods listed in Table 4-1 may be used by the RCT as deemed appropriate and as required by project- or task-specific RWPs. When conducted, monitoring will be performed in accordance with *Manual 15B—Radiation Protection Procedures* and *Manual 15C—Radiological Control Procedures*. The data obtained from monitoring will be used by RadCon personnel to evaluate the effectiveness of engineering controls and decontamination methods and procedures and to alert personnel to potential radiation sources.

The RadCon personnel will use radiation and contamination detectors and counters listed in Table 4-1, or equivalent instruments, to provide radiological information to personnel. Daily operational and source checks will be performed on all portable survey instruments to ensure they are within the specified baseline calibration limits. Accountable radioactive sources will be maintained in accordance with MCP-137, “Radioactive Source Accountability and Control.” All radiological survey and monitoring equipment will be maintained and calibrated in accordance with the manufacturer’s recommendations, existing RadCon protocol, and in conformance with MCP-93, “Health Physics Instrumentation.”

4.2.3 Personnel Radiological Exposure Monitoring

Personal radiological monitoring will be conducted to quantify radiation exposure and potential for uptakes as stated in the project- or task-specific RWP. This may include the use of external dosimetry, surface monitoring, and internal dosimetry methods to ensure that engineering controls, administrative controls, and work practices are effectively mitigating radiological hazards.

4.2.3.1 External Dosimetry. Dosimetry requirements will be based on the radiation exposure potential during project tasks. When dosimetry is required, all personnel who enter the project area will be required to wear personal dosimetry devices, as specified by RadCon personnel and the RWP, and in accordance with Manual 15A—Radiation Control Procedures.

When RWPs are required for project tasks, the Radiological Control and Information Management System (RCIMS) will be used to track external radiation exposures to personnel. Individuals are responsible for ensuring that all required personal information is provided to RadCon personnel for entry into RCIMS and logging into RCIMS when electronic dosimeters are used.

4.2.3.2 Internal Monitoring. The purpose of internal dose monitoring is to demonstrate the effectiveness of contamination control practices and to document the nature and extent of any internal uptakes that might occur. Internal dose evaluation programs will be adequate to demonstrate compliance with 10 Code of Federal Regulations (CFR) 835, “Occupational Radiation Protection.” The requirement for whole body counts and bioassays will be based on specific project tasks or activities and will be the determination of the radiological engineer. Bioassay requirements will be specified on the RWP, and project personnel will be responsible for submitting required bioassay samples upon request.

5. ACCIDENT AND EXPOSURE PREVENTION

Project activities will present numerous safety, physical, chemical, and radiological hazards to personnel conducting these tasks. It is critical that all personnel understand and follow the site-specific requirements of this HASP. Engineering controls, hazard isolation, specialized work practices, and the use of PPE will all be implemented to eliminate or mitigate all potential hazards and exposures where feasible. However, all personnel are responsible for the identification and control of hazards in their work area in accordance with Integrated Safety Management System (ISMS) principals and practices. **At no time will hazards be left unmitigated without implementing some manner of controls** (e.g., engineering controls, administrative controls, or the use of PPE). Project personnel should use stop work authority in accordance with PRD-1004 or MCP-553, "Stop Work Authority," where it is perceived that imminent danger to personnel, equipment, or the environment exists.

This HASP is to be used in conjunction with PRD-25, "Activity Level Hazard Identification, Analysis, and Control," and work authorization and control documents such as Standard (STD) -101, "Integrated Work Control Process"; work orders; job safety analyses (JSAs); MCP-3562, "Hazard Identification, Analysis, and Control of Operational Activities"; and operational technical procedures. Where appropriate, MCP-3562 and GDE-6212, "Hazard Mitigation Guide for Integrated Work Control Process"; mitigation guidance; JSAs; and RWPs will be incorporated into applicable sections of the HASP.

5.1 Voluntary Protection Program and Integrated Safety Management System

The INEEL safety processes embrace the Voluntary Protection Program (VPP) and ISMS criteria, principles, and concepts to identify and mitigate hazards, thereby preventing accidents. All management and workers are responsible for implementing safety policies and programs and for maintaining a safe and healthful work environment. Project personnel are expected to take a proactive role in preventing accidents, ensuring safe working conditions for themselves and fellow personnel, and complying with all work control documents, procedures, and permits.

The ISMS is focused on the system side of conducting operations, and VPP concentrates on the people aspect of conducting work. Both programs define work scope, identify and analyze hazards, and mitigate the hazards. Additional information on these programs is available on the INEEL Intranet. Bechtel BWXT Idaho, LLC (current primary management and operating contractor) and its subcontractors participate in VPP and ISMS for the safety of their employees. This document includes all elements of both systems.

5.2 General Safe-Work Practices

Sections 1 and 2 defined the project scope of work and associated project-specific hazards and mitigation. The following practices are mandatory for all project personnel to further reduce the likelihood of accidents and injuries. All visitors permitted to enter work areas must follow these requirements. Visitors to the work site must check in with the project FTL. Failure to follow these practices may result in permanent removal from the project and other disciplinary actions. Any problems must be immediately reported to the FTL and facility management (TAN shift supervisor). The project FTL and HSO will be responsible for ensuring that the following safe-work practices are adhered to at the project site:

- Limit work area access to authorized personnel only, in accordance with PRD-1007, “Work Coordination and Hazard Control,” and Section 8.

- All personnel have the authority to initiate STOP WORK actions in accordance with PRD-1004 or MCP-553, “Stop Work Authority.”

- Personnel will not eat, drink, chew gum or tobacco, smoke, apply sunscreen, or perform any other practice that increases the probability of hand-to-mouth transfer and ingestion of materials in work areas, except within designated areas.

- Be aware of and comply with all safety signs, tags, barriers, and color codes as identified in accordance with PRD-2022, “Safety Signs, Color Codes, and Barriers,” or PRD-5117, “Accident Prevention Signs, Tags, Barriers, and Color Codes.”

- Be alert for dangerous situations, strong or irritating odors, airborne dusts or vapors, and spills that might be present. Report all potentially dangerous situations to the FTL or HSO.

- Avoid direct contact with hazardous materials or waste. Personnel will not walk through spills or other areas of contamination and will avoid kneeling, leaning, or sitting on equipment or surfaces that might be contaminated.

- Be familiar with the physical characteristics of the project site, including, but not limited to:

  - Prevailing wind direction

  - Location of fellow personnel, equipment, and vehicles

  - Communications at the project site and with TAN

  - Area and the type of hazardous materials stored and waste disposed of

  - Major roads and means of access to and from the project site

  - Location of emergency equipment

  - Warning devices and alarms for area or facility

  - Capabilities and location of nearest emergency assistance.

- Report all broken skin or open wounds to the operations manager, FTL, or HSO. An OMP physician must examine all wounds to determine the nature and extent of the injury. If required to enter into a radiological contamination area, a RadCon supervisor will determine whether the wound can be bandaged adequately in accordance with Article 542 of PRD-183, “Radiological Control Manual.”

- Prevent releases of hazardous materials. If a spill occurs, personnel must try to isolate the source (if possible, and if this does not create a greater exposure potential) and then report it to the FTL, facility supervision, and the HSO. The Warning Communications Center (WCC) will be notified and additional actions will be taken, as described in Section 11. Appropriate spill response kits or other containment and absorbent materials will be maintained at the project site.

- Illumination levels during project tasks will be in accordance with 29 CFR 1910.120 (Table H-120.1, "Minimum Illumination Intensities in Foot-Candles").

- Ground-fault protection will be provided whenever electrical equipment is used outdoors.

- Keep all ignition sources at least 15 m (50 ft) from explosive or flammable environments and use nonsparking, explosion-proof equipment, if advised to do so by safety professionals.

- Follow all safety and radiological precautions and limitation of technical procedures and requirements identified in work packages.

5.3 Radiological and Chemical Exposure Prevention

Exposure to potential chemical, radiological, and physical hazards will be prevented or mitigated (where possible) by the use of engineering controls, administrative controls, or PPE. All project personnel are responsible for understanding the hazard identification and mitigation measures necessary to prevent exposures.

5.3.1 Radiological Exposure Prevention—As Low as Reasonably Achievable Principles

Radiation exposure of project personnel will be controlled such that radiation exposures are well below regulatory limits and that there is no radiation exposure without commensurate benefit. **Unplanned and preventable exposures are considered unacceptable.** All project tasks will be evaluated with the goal of eliminating or minimizing exposures. All project personnel have the responsibility for following as-low-as reasonably achievable principles and practices. Personnel working at the site must strive to keep both external and internal radiation doses as low as reasonably achievable by adopting the following practices.

5.3.1.1 External Radiation Dose Reduction. Radiological work permits will be written as required for project tasks that will define hold points, required dosimetry, RCT coverage, radiological controlled areas, and radiological limiting conditions in accordance with MCP-7, "Radiological Work Permit." Radiological Control personnel will participate in the prejob briefing required by MCP-3003, "Performing Pre-Job Briefings and Documenting Feedback," to ensure that all personnel understand the dose rate limits and limiting conditions on the RWP. All personnel will be required to read and acknowledge the RWP requirements before being allowed to sign the RWP (or scan the RWP bar code) and obtain electronic dosimetry.

Basic protective measures used to reduce external doses include (1) minimizing time in radiation areas, (2) maximizing the distance from known sources of radiation, and (3) using shielding whenever possible. The following bulletized lists are methods to minimize external dose.

Methods for minimizing time include the following:

- Plan and discuss the tasks before entering a radiation area (including having all equipment and tools prepared).

- Perform as much work as possible outside radiation areas and take advantage of lower dose rate areas (as shown on the radiological survey maps).

- Take the most direct route to the tasks and work efficiently.

- If problems occur in the radiation areas, hold technical discussions outside radiation areas, then return to the work area to complete the task.
- If stay times are required, know your stay time and use appropriate signal and communication method to let others in the area know when the stay time is up.
- Respond to electronic dosimetry alarms by notifying others in the area and the RCT, and exit the radiation area through the designated entry and exit point.
- Know your current dose and your dose limit. DO NOT EXCEED YOUR DOSE LIMIT.
- Methods for maximizing distance from sources of radiation include the following:
- Use remote-operated equipment or controls where required
- Stay as far away from the source of radiation as possible (extremely important for point sources where, in general, if the distance between the source is doubled, the dose rate falls to one-fourth of the original dose rate)
- Become familiar with the radiological survey map for the area in which work will be performed as well as high and low dose-rate locations, and take advantage of low dose-rate areas.
- Proper use of shielding includes the following:
- Know what shielding is required and how it is to be used for each radiation source
- Take advantage of the equipment and enclosures for shielding yourself from radiation sources
- Wear safety glasses to protect eyes from beta radiation.

5.3.1.2 Internal Radiation Dose Reduction. An internal radiation dose potential exists. An internal dose is a result of radioactive material being taken into the body. Radioactive material can enter the body through inhalation, ingestion, absorption through wounds, or injection from a puncture wound. Reducing the potential for radioactive material to enter the body is critical to avoid an internal dose. The following are methods to minimize internal radiation dose hazard:

- Know the potential and known contamination sources and locations, and minimize or avoid activities in those areas
- Wear protective clothing and respiratory protection as identified on the RWP, perform all respirator leak checks, and inspect all PPE before entering contaminated areas or areas with airborne radioactivity
- Use a high-efficiency particulate air (HEPA) filter exhaust system
- When inside contaminated areas, do not touch your face (adjust glasses or PPE) or other exposed skin
- When exiting contaminated areas, follow all posted instructions and remove PPE in the order prescribed (if questions arise, consult RadCon personnel)

- Conduct whole body personnel survey when exiting the contaminated area, then proceed directly to the personnel contamination monitor

- Report all wounds or cuts (including scratches and scrapes) before entering radiologically contaminated areas

- Wash hands and face before eating, drinking, smoking, or engaging in other activities that could provide a pathway for contaminants.

Monitoring for radiation and contamination during project tasks will be conducted in accordance with the RWP; PRD-183, "Radiological Control Manual"; *Manual 15B—Radiation Protection Procedures*, *Manual 15C—Radiological Control Procedures*, and as deemed appropriate by RadCon personnel.

5.3.2 Chemical and Physical Hazard Exposure Avoidance

> **NOTE:** Identification and control of exposures to carcinogens will be conducted in accordance with MCP-2703, "Carcinogens."

The threshold limit values (TLVs) or other occupational exposure limits have been established for numerous chemicals and physical agents (e.g., noise, heat, or cold stress) that might be encountered. These exposure limits provide guidelines in evaluating airborne, skin, and physical agent exposures. The TLVs represent levels and conditions under which it is believed that nearly all workers may be exposed day after day without adverse health effects. The TLV-TWA is a time-weighted average concentration for a conventional 8-hr workday and a 40-hr workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse health effects. Action limits (instantaneous concentrations for short time periods) have been established (Section 3) to further reduce the likelihood of exceeding TLVs.

Controls will be employed to eliminate or mitigate chemical and physical hazards wherever feasible. The hierarchy of controls in order are (1) engineering controls, (2) administrative controls, and (3) PPE. In addition to these controls, use of technical procedures and work orders, hold points, training, and monitoring of hazards will be used, as appropriate, to reduce exposure potential. Some methods of exposure avoidance include:

- Wearing all required PPE, inspecting all pieces before donning, and taping all seams

- Changing PPE if it becomes damaged or shows signs of degrading

- Minimizing time in direct contact with hazardous material or waste

- Doffing PPE in accordance with standard practices (i.e., rolling outer surfaces in and down) and following doffing sequence

- Wash hands and face before eating, drinking, smoking, or engaging in other activities that can provide a pathway for contaminants.

5.4 Buddy System

The two-person, or “buddy” system, will be used during project tasks. The buddy system is most often used during project activities requiring the use of protective clothing and respiratory protection where heat stress and other hazards might impede a person’s ability to self-rescue. The buddy system requires each employee to assess and monitor his or her buddy’s mental and physical well-being during the course of the operation. A buddy must be able to perform the following activities:

- Provide assistance, if required
- Verify the integrity of PPE
- Observe his or her buddy for signs and symptoms of heat stress, cold stress, or contaminant exposure
- Notify other personnel in the area if emergency assistance is needed.

The buddy system will be administered by the FTL in conjunction with the HSO.

6. PERSONAL PROTECTIVE EQUIPMENT

This section provides guidance for the selection and use of PPE to be worn for project tasks and contingencies for upgrading and downgrading PPE. Types of PPE are generally divided into two broad categories: (1) respiratory protective equipment and (2) PPE. Both of these categories are incorporated into the standard two levels of protection (Levels C and D).

The purpose of personal protective clothing and equipment is to shield or isolate individuals from the chemical, physical, radiological, and safety hazards that might be encountered during project tasks when engineering and other controls are not feasible or cannot provide adequate protection. It is important to realize that no one PPE ensemble can protect against all hazards under all conditions and that proper work practices and adequate training will serve to augment PPE to provide the greatest level of protection to workers.

The Idaho Completion Project (ICP) PPE policy requires that field workers wear, as a minimum, sturdy leather boots that rise above the ankles, safety glass with side shields, and hard hats. The HSO or safety professional will determine where and when this requirement will be invoked for each project.

The type of PPE will be selected, issued, used, and maintained in accordance with PRD-2001 or PRD-5121, "Personal Protective Equipment." Selection of the proper PPE is based on the following considerations:

- Specific conditions and nature of the tasks
- Potential contaminant routes of entry
- Physical form and chemical characteristics of hazardous materials, chemicals, or waste
- Toxicity of hazardous materials, chemicals, or waste that might be encountered
- Duration and intensity of exposure
- Compatibility of chemical(s) with PPE materials and potential for degradation or breakthrough
- Environmental conditions (e.g., humidity, heat, cold, rain)
- The hazard analysis (Section 3) evaluation of this HASP.

If radiological contamination is encountered at levels requiring the use of anticontamination clothing, a task-specific RWP will be developed and MCP-432, "Radiological Personal Protective Equipment," will be followed.

The PPE requirement for specific project tasks is identified in Table 6-1. This list may be augmented by an SWP or RWP. Potential exposures and hazards will be monitored (as discussed in Section 4) during the course of the project to evaluate changing conditions and to determine PPE level adequacy and modifications.

Table 6-1. Task-based personal protective equipment requirements and modifications.

Task	Initial Level of Personal Protective Equipment	Upgrade Contingency	Downgrade Contingency	Upgrade or Downgrade Criteria	Personal Protective Equipment Modifications and Comments
Soil sampling	D+	C	D	Upgrade to Level C if airborne concentrations exceed action limits. Downgrade to Level D if contact with surveys shows no detectable contamination on surfaces.	Level C respiratory protection defined by the industrial hygienist or radiological control technician based on airborne contaminant concentrations Leather gloves for all material handling tasks.
Heavy equipment operations	D	D+	N/A	Upgrade to Level D+ if contact with waste material cannot be avoided.	The D+ protective clothing consists of Tyvek hooded coveralls (or equivalent). Leather gloves
Equipment decontamination	C	C+	D+	Upgrade to Level C+ if splashing during decontamination of lead, cadmium, or radiologically contaminated equipment cannot be avoided. Downgrade to Level D+ for decontamination of small items using spray and wipe decontamination methods.	Level C respiratory protection defined by the industrial hygienist or radiological control technician based on airborne contaminant concentrations. Level C protective clothing consists of Tyvek (or equivalent) hooded coverall. Level C+ protective clothing consists of Saranex (or equivalent coated hooded coverall). Leather gloves over nitrile for equipment and material handling before or after decontamination tasks Double pair nitrile gloves during decontamination tasks.

6.1 Respiratory Protection

The primary objective will be to prevent atmospheric contamination in the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors. This will be accomplished as far as feasible by accepted engineering control measures (e.g., enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators will be selected and used.

Required task-based respiratory protection and protective clothing are listed on Table 6-1. Respirators might be required for specific project tasks. All personnel required to wear respirators will complete training and be fit-tested before being assigned a respirator in accordance with the training and documentation requirements in Section 7. Requirements for respirator use, emergency use, storage, cleaning, and maintenance—as stated in MCP-2726 and PRD-2109, "Respiratory Protection"— will be followed.

6.2 Personal Protective Equipment Levels

Table 6-2 lists PPE requirements for the two levels of PPE that may be worn during the course of the project. Applicable PPE levels will be required for conducting project tasks. Modifications to these levels will be made under the direction of the HSO in consultation with the project Industrial Hygiene and RadCon personnel, as appropriate. Such modifications are routinely employed during hazardous waste operations and emergency response (HAZWOPER) site activities to maximize efficiency and to meet site-specific needs without compromising personnel safety and health.

6.2.1 Level D Personal Protective Equipment

Level D PPE will only be selected for protective clothing and not on a site with respiratory or skin absorption hazards requiring whole-body protection. Level D PPE provides no protection against airborne chemical hazards, but rather is used for protection against surface contamination and physical hazards. Level D PPE will only be allowed in areas that have been characterized as having limited contamination hazards.

6.2.2 Level C Personal Protective Equipment

Level C PPE will be worn when the task site contaminants have been well-characterized indicating that personnel are protected from airborne exposures by wearing an air-purifying respirator with the appropriate cartridges, no oxygen-deficient environments exist (less than 19.5% at sea level), and that there are no conditions that pose immediate danger to life or health.

Table 6-2. Levels and options of personal protective equipment.

Personal Protective Equipment Level	Personal Protective Equipment Required	Optional Personal Protective Equipment or Modifications
D	Coveralls or standard work clothes (coverall material type based on IH's determination) Hard hat (unless working indoors with no overhead or falling debris hazards) meeting ANSI Z89.1 requirements Eye protection (safety glasses meeting ANSI Z87.1 requirements as a minimum) Hand protection (material based on type of work and hazardous materials being handled) Safety footwear (steel or protective toe and shank) meeting ANSI Z41 requirements or sturdy leather footwear above the ankle for construction tasks	Chemical or radiological protective clothing (Tyvek or Saranex) by IH or RCT Chemically resistant hand and foot protection (e.g., inner and outer gloves and boot liners) Radiological modesty garments under outer protective clothing (as required by RWP) Any specialized protective equipment (e.g., hearing protection, cryogenic gloves, face shields, welding goggles, and aprons)
C	Level D ensemble with the following respiratory and whole-body protection upgrades:[a] Full-facepiece air purifying respirator equipped with a National Institute of Occupational Safety and Health-approved HEPA filter or chemical combination cartridge (IH to specify cartridge type) **OR** An air hood operating at a minimum flow of 6 cfm or a full-facepiece-supplied air respirator with a 10-minute escape bottle, a self-contained breathing apparatus, or an escape air-purifying combination HEPA or chemical cartridge (supplied air respirator hose length no more than manufacturer's specification and under no circumstances greater than 91 m [300 ft]) **AND** Standard Tyvek (or equivalent) coverall **OR** Chemical-resistant coveralls (e.g., Tyvek QC, Tychem 7500, or Saranex-23-P) (IH to specify material).	Chemical-resistant outer shoe or boot cover (IH or RCT to specify material) Inner chemical-resistant gloves with cotton liners (as determined by the IH and RWP) Outer chemical-resistant gloves (as determined by the IH) Radiological modesty garments under outer protective clothing (as required by RWP) Any specialized protective equipment (e.g., hearing protection, welding lens, and aprons)

a. Upgrades are determined by the industrial hygienist in conjunction with other environment, safety, and health professionals.
ANSI = American National Standards Institute
HEPA = high-efficiency particulate air
IH = industrial hygienist
RCT = radiological control technician
RWP = radiological work permit

NOTE: Personnel must inspect all PPE before donning and before entry into any work zone. Items found to be defective or become unserviceable during use will be doffed and disposed of in accordance with posted procedures and placed into the appropriate waste stream. The PPE inspection guidance is provided in Table 6-3.

6.3 Personal Protective Clothing Upgrading and Downgrading

The project HSO, in consultation with the project IH (and RadCon personnel), will be responsible for determining when to upgrade or downgrade PPE requirements. Upgrading or downgrading of PPE based on changing site conditions or activities is a normal occurrence. Action levels listed in Table 4-2 serve as the initial basis for making such decisions. Additional reasons for upgrading or downgrading are listed in the following subsections and will be reflected in the RWP.

6.3.1 Upgrading Criteria for Personal Protective Equipment

The level of PPE required will be upgraded for the following reasons and work will halt until PPE upgrading has been completed:

- Identification of new, unstable, or unpredictable site hazards
- Temporary loss or failure of any engineering controls
- Contaminants that present difficulty in monitoring or detecting
- Known or suspected presence of skin absorption hazards
- Identified source or potential source of respiratory hazard(s) not anticipated
- Change in the task procedure that could result in an increased contact with contaminants or meeting any of the criteria listed above.

6.3.2 Downgrading Criteria

The level of PPE will be downgraded under the following conditions:

- Elimination of hazard or completion of task(s) requiring specific PPE
- Implementation of new engineering or administrative controls that eliminate or significantly mitigate the hazard
- Sampling information or monitoring data that show the contaminant levels to be stable and lower than established action limits
- Elimination of potential skin absorption or contact hazards.

6.4 Inspection of Personal Protective Equipment

All PPE ensemble components must be inspected before use and when in use within project work zones. Self-inspection and the use of the buddy system, once PPE is donned, will serve as the principle forms of inspection. If PPE should become damaged or degradation or permeation is suspected, the individual wearing the PPE will inform others of the problem and proceed directly to the work zone exit point to doff and replace the unserviceable PPE. If PPE fails, personnel should follow their training. (In addition, all PPE that becomes grossly contaminated or presents a potential source for the spread of such contamination will be required to be decontaminated or replaced). Table 6-3 provides an inspection checklist for common PPE items. Where specialized protective clothing or respiratory protection is used or required, the manufacturer's inspection requirements in conjunction with regulatory or industry inspection practices will be followed. Consult the project IH, safety professional, and RCT about PPE inspection criteria.

Table 6-3. Inspection checklist for personal protection equipment.

Personal Protection Equipment Item	Inspection
Respirators (full-facepiece air-purifying respirators)	**Before use:** Check condition of the facepiece, head straps, valves, fittings, and all connections for tightness. Check cartridge to ensure that proper type or combination is being used for atmospheric hazards to be encountered, and inspect threads and O-rings for pliability, deterioration, and distortion.
Level D and C clothing	**Before use:** Visually inspect for imperfect seams, nonuniform coatings, and tears. Hold PPE up to the light and inspect for pinholes, deterioration, stiffness, and cracks. **While wearing in the work zone:** Inspect for evidence of chemical attack such as discoloration, swelling, softening, and material degradation. Inspect for tears, punctures, and zipper or seam damage. Check all taped areas to ensure that they are still intact.
Gloves	**Before use:** Pressurize rubber gloves to check for pinholes (blow in the glove, then roll until air is trapped and inspect). No air should escape. **Leather gloves:** Inspect seams and glove surface for tears and splitting and verify no permeation has taken place.

7. PERSONNEL TRAINING

All INEEL personnel will receive training, as specified in 29 CFR 1910.120 or 29 CFR 1926.65 and INEEL companywide manuals as applicable. Table 7-1 summarizes the project-specific training requirements for personnel-based access requirements, responsibilities at the project site, potential hazards, and training level requirements.

Modifications to (e.g., additions to or elimination of) training requirements listed in Table 7-1 might be necessary based on changing field conditions. Any changes to the requirements listed in Table 7-1 must be approved by the HSO with concurrence from the FTL, project manager, RCT, and IH, as applicable. These changes should be based on site-specific conditions and a change to the HASP will be processed, as defined by instructions from Form 412.11, "Document Management Control System (DMCS) Document Action Request (DAR)."

7.1 General Training

All project personnel are responsible for meeting training requirements including applicable refresher training. Evidence of training will be maintained at the project site, field administrative location, or electronically (e.g., Training Records and Information Network). Nonfield team personnel and visitors must be able to provide evidence of meeting required training for the area of the site they wish to access before being allowed into a project area. As a minimum, all personnel who access project locations must receive a site-specific briefing, must wear PPE, and must provide objective evidence of having completed INEEL computer-based PPE training (00TRN288, "Personal Protective Equipment") or equivalent in accordance with 29 CFR 1910.132, "General Requirements."

7.2 Project-Specific Training

Before beginning work at the project site, field team members will receive project-specific HASP training that will be conducted by the HSO (or designee). This training will consist of a complete review of (1) a controlled copy of the project HASP, attachments, and DARs; (2) applicable JSAs and SWPs (if required); (3) work orders; and (4) other applicable work control and work authorization documents with time for discussion and questions. Project-specific training can be conducted in conjunction with, or separately from, the required formal prejob briefing (MCP-3003, "Performing Pre-Job Briefings and Documenting Feedback").

At the time of project-specific HASP training, personnel training records will be checked and verified to be current and complete for all the training requirements shown in Table 7-1. After the HSO (or designee) has completed the site-specific training, personnel will sign Form 361.25, "Group Read and Sign Training Roster," or equivalent, indicating that they have received this training; understand the project tasks, associated hazards, and mitigations; and agree to follow all HASP and other applicable work control and safety requirements. Form 361.25 (or equivalent) training forms are available on the INEEL Intranet under "Forms."

A trained HAZWOPER 8-hour supervisor (FTL or other person who has been trained by the HAZWOPER supervisor) will monitor the performance of each newly 24-hour or 40-hour trained worker to meet the 1 or 3 days of supervised field experience, respectively, in accordance with 29 CFR 1910.120(e). Following the supervised field experience period, the supervisor will complete Form 361.47, "Hazardous Waste Operations (HazWoper) Supervised Field Experience Verification," or equivalent, to document the supervised field experience.

Table 7-1. Required project-specific training.

Required Training	Field Team Leader, Health and Safety Officer, and Samplers	Other Field Team Members	Access into the Designated or Controlled Work Area, Construction Area, or Contamination Reduction Zone	Access to Project Areas Outside Designated or Controlled Work Area, Construction Area, or Contamination Reduction Zone
40-hour HAZWOPER[a]—operations	Yes	b	b	
24-hour HAZWOPER[a]—operations		b	b	
Project-specific health and safety plan training[c]	Yes	Yes	Yes	
Project-site orientation briefing[d]				Yes
Fire extinguisher training (or equivalent)	e	e		
Cardiopulmonary resuscitation, medic first aid	e	e		
Respirator training (contingency only)	f	f		
Lead and cadmium awareness training	Yes	g	g	

NOTE: Shaded fields indicate specific training is not required or applicable.

a. Includes 8-hour HAZWOPER refresher training as applicable, and supervised field experience as follows: 40-hour HAZWOPER = 24-hour supervised field experience and 24-hour HAZWOPER = 8-hour supervised field experience.

b. The 40-hour or 24-hour HAZWOPER training requirement will be determined by the HSO based on the nature of the project tasks and potential for exposure to contaminants or safety hazards.

c. Includes project-specific hazards communications (29 CFR 1910.120), site-access and security, decontamination and emergency response actions, as required by 29 CFR 1910.120(e).

d. Orientation includes briefing of site hazards, designated work areas, emergency response actions, and PPE requirements. Personnel receiving project-site orientation briefing only are limited to the areas outside designated work areas and must be escorted by a project supervisor or designee who is fully trained on the requirements of the health and safety plan.

e. At least one trained person onsite when field team is working. The HSO may determine the appropriate number of personnel requiring training.

f. Only required if entering area requiring respiratory protection (e.g., action levels exceeded or the industrial hygienist sampling shows respirators required).

g. Only if entering areas where initial exposure determination indicates exposure above the action limit is possible.

CFR = *Code of Federal Regulations*
HAZWOPER = hazardous waste operations and emergency response
HSO = health and safety officer
PPE = personal protective equipment

NOTE 1: Supervised field experience is only required if personnel have not previously completed this training at another CERCLA site (documented) or they are upgrading from 24- to 40-hour HAZWOPER training. A copy of the training record must be kept at the project site as evidence of training or be available electronically.

NOTE 2: Completed training project forms (Form 361.47 or equivalent) should be submitted to the ICP training coordinator for inclusion in the Training Records and Information Network system within 5 working days of completion.

7.3 Plan-of-the-Day Briefing, Feedback, and Lessons Learned

A daily planning meeting, or equivalent meeting, will be conducted by the FTL or designee. During this meeting, daily tasks are to be outlined; hazards identified; hazard controls, mitigation, and work zones established; PPE requirements discussed; and feedback from personnel solicited. At the completion of this meeting, any new work control documents will be reviewed and signed (e.g., SWP, JSA, or RWP).

NOTE: If a formal MCP-3003 prejob briefing is conducted during the work shift, a planning meeting is not required.

Particular emphasis will be placed on lessons learned from the previous workday's activities and how tasks can be completed in the safest, most efficient manner. All personnel are encouraged to contribute ideas to enhance worker safety and mitigate potential exposures at the project sites. This planning meeting will be conducted as an informal meeting and the only required record will be to document the completion of the planning meeting in the (FTL or construction engineer or subcontractor technical representative) logbook.

Safety and health topic-specific training or safety meetings may also be conducted during the course of the project to reinforce key safety topics. They may be conducted by project safety and the industrial hygienist or any field team member and should be performed in conjunction with the planning meeting. Credit for a safety meeting can be received for such topic-specific training if a tailgate training form (INEEL Form 361.24, "Tailgate Attendance Roster," or equivalent) is completed and submitted to the appropriate training coordinator for entry into the Training Records and Information Network.

8. SITE CONTROL AND SECURITY

Site control and security will be maintained at the project site during all activities to prevent unauthorized personnel from entering the work area. Entry into and exit out of these areas will be controlled through the appropriate use of barriers, signs, and other measures in accordance with PRD-2022, "Safety Signs, Color Codes, and Barriers," or PRD-5117, "Accident Prevention Signs, Tags, Barriers, and Color Codes."

The HSO and safety professional should be consulted regarding equipment layout at the project site (in conjunction with the subcontractor superintendent for subcontractor-owned equipment) to minimize personnel hazards from equipment. The focus should be on equipment with stored energy (electrical, pressurized systems, elevated materials/equipment, chemical), moving and rotating parts (equipment that is guarded and that has open rotating parts such as a drill rig), and other equipment with the potential to result in personnel injuries from being struck-by, caught-between, or entangled in such equipment. The equipment layout at the project site should reflect the nature of the hazard present and should be mitigated through the use of engineering controls (barriers, guards, isolation), administrative controls (roped-off restricted areas or controlled entry access), and qualifications of operators and those assisting in the operation of the equipment, when required.

Good housekeeping will be maintained at all times during the course of the project to include maintaining working and walking surfaces to minimize tripping hazards, stacking or storing in a centralized location materials and equipment in a centralized location when not in use, and regular cleanup of debris and trash that accumulates at the project site.

Both radiological and nonradiological hazards (including industrial safety hazards) will be evaluated when establishing the initial work zone size, configuration, and location. Figure 8-1 illustrates an example of work zones that may be established at the project task site, based on HSO/RCT/IH recommendations. Common barriers may be used to delineate both radiological and nonradiological work-zone postings, depending on the nature and extent of contamination. If common barriers are used, they will be delineated and posted in accordance with both sets of requirements (29 CFR 1910.120 and 10 CFR 835), using appropriately colored rope and postings. These zones may change in size and location as project tasks evolve, based on project monitoring data, and as wind direction changes. Additionally, entrance and egress points will change based on these same factors. Work zones may include:

- Support zone (controlled area)
- Contamination reduction zone, radiological buffer area, including a contamination reduction corridor if radiological hazards are present
- Exclusion zone, radiation area, high radiation area, contamination area, high contamination area, or very high radiation area.

Visitors may be admitted into work areas provided they (1) are on official business; (2) have received site-specific training or orientation by the FTL or designee; (3) have met all the site-specific training requirements for the area they have a demonstrated need to access (including PPE training), as listed on Table 7-1; and (4) wear all required PPE.

NOTE: Visitors may not be allowed into controlled work areas during certain tasks in order to minimize risks to workers and visitors. The determination as to any visitor's need for access into the controlled work area will be made by the FTL in consultation with the HSO.

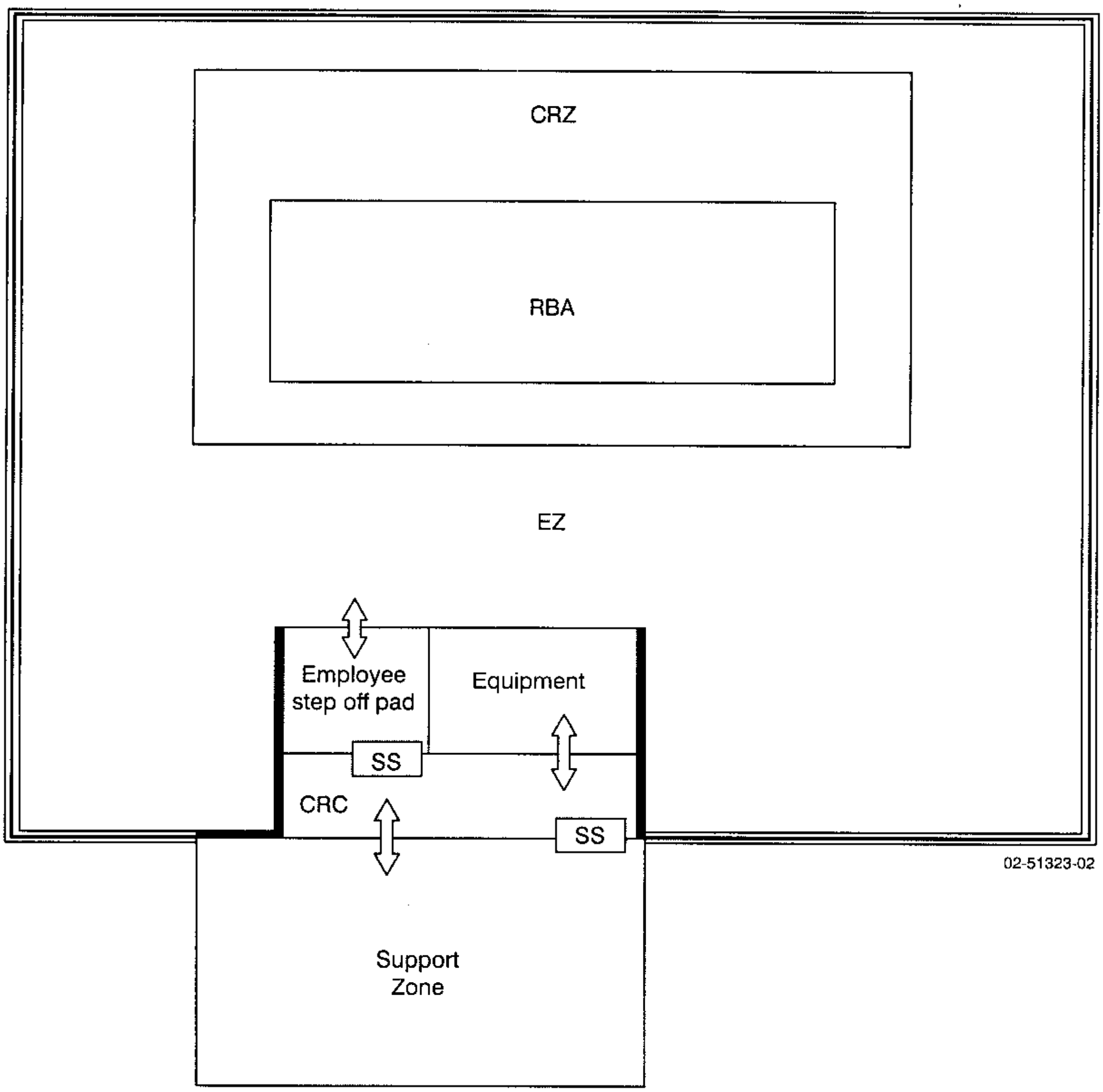

Figure 8-1. Work zone example.

8.1 Exclusion Zone

The exclusion zone will be large enough to encompass the primary task area for sampling and to allow equipment and personnel to move about freely and conduct necessary tasks. The minimum number of personnel required to safely perform project tasks will be allowed into the exclusion zone. If the exclusion zone will be relocated to another site or reconfigured, it will be delineated in a configuration large enough to prevent nonfield team personnel in the support zone from being exposed to potential safety and health hazards. The exclusion zone shape and size will be based on the tasks being conducted, existing structures and facilities, and potential for impact to adjacent areas from project tasks or contaminants.

The exclusion zone is a controlled access zone at all times. An entry and exit point will be established at the periphery of the exclusion zone and the contamination reduction corridor to regulate the flow of personnel and equipment. The exclusion zone boundary will be delineated with rope or printed hazard ribbon and posted with signs in accordance with PRD-5117, “Accident Prevention Signs, Tags, Barriers, and Color Codes,” or PRD-2022, “Safety Signs, Color Codes, and Barriers.”

Factors that will be considered when establishing the exclusion zone boundary include (1) tasks being conducted, (2) air monitoring data, (3) radiological contamination data, (4) radiation fields, (5) equipment in use, (6) the physical area necessary to conduct site operations, and (7) the potential for contaminants to be blown from the area. The boundary may be expanded or contracted as these factors change or additional monitoring information becomes available. All personnel who enter the exclusion zone will wear the appropriate level of PPE for the hazards present and have required training as listed in Sections 7 of this HASP, respectively.

8.2 Contamination Reduction Zone and Corridor

The contamination reduction zone and the contamination reduction corridor are transition areas surrounding the exclusion zone and are located between the exclusion zone and support zone. The contamination reduction corridor may not be formally delineated, but will be designated by the travel path from the established contamination reduction zone-controlled entry and exit point and the exclusion zone entry and exit point. The contamination reduction zone and contamination reduction corridor will serve to buffer the support zone from potentially contaminated exclusion zone areas. The contamination reduction zone and contamination reduction corridor may serve as staging areas for equipment and temporary rest areas for personnel.

8.3 Support Zone

The support zone will be considered a “clean” area. The location of the support zone will be in a prevailing upwind direction from the exclusion zone (where possible) and readily accessible from the nearest road. The support zone is a designated area or building outside the contamination reduction zone and does not have to be delineated. Support trailers, vehicle parking, additional emergency equipment, extra PPE, and stored monitoring and sampling equipment may be located in the support zone. Visitors who do not have appropriate training to enter other project areas will be restricted to this zone.

8.4 Radiological Control and Release of Materials

Potential radiologically contaminated items or equipment will not be released until required radiological surveys have been completed (e.g., hand-held instruments and swipes) in accordance with MCP-139, “Radiological Surveys”; MCP-425, “Radiological Release Surveys, and the Disposition of Contaminated Materials”; as stated in the RWP; and as directed by RadCon personnel.

8.5 Site Security

All project site areas will be secured and controlled during normal work hours, as described in the previous sections. These include the TSF-46, -47, and -48 at WAG 1, OU 1-10. During nonworking hours, the general project sites located inside INEEL facilities are controlled by the facility fence and normal security access requirements. However, additional project site security and control will be required to prevent unauthorized personnel from entering the project area and being exposed to potential safety or health hazards. This will be accomplished by delineating project areas with rope boundaries and posting where hazards are left unmitigated (e.g., open trenches, exposed contaminated soil, or equipmentleft onsite). Signage will be left in place during off-hours and weekends to prevent personnel from inadvertently entering the area.

The FTL has the primary responsibility for ensuring that the project area is secured. The HSO and RadCon (where required) will ensure that all health and safety and radiological postings of the area are intact when leaving the site and will be responsible for maintaining them for the duration of the project. Project personnel are trained about site access and control requirements during project-specific HASP training and will not cross roped areas without the proper training and authorization, regardless of whether a sign is in place or not.

NOTE: Signs are routinely lost because of high winds and will be replaced as soon as possible upon discovery.

8.6 Wash Facilities and Designated Eating Areas

Ingestion of hazardous substances is possible when workers do not practice good personal hygiene habits. It is important to wash hands, face, and other exposed skin thoroughly after completion of work and before smoking, eating, drinking, and chewing gum or tobacco. For project personnel, and/or subcontractor personnel, a designated eating area and wash facilities in TAN-607 will be provided.

8.7 Designated Smoking Area

Smoking areas will be designated and personnel will comply with all INEEL smoking policies, including disposing of smoking materials in the proper receptacle. Smoking will not be permitted outside facilities without establishing a designated smoking area. The project safety professional in consultation with the designated fire protection engineer will be the single point of contact for establishing any smoking area outside facilities; however, such areas may not be permitted at certain times of the year because of high or extreme fire danger.

9. OCCUPATIONAL MEDICAL SURVEILLANCE

Task-site personnel will participate in the INEEL occupational medical surveillance program (or equivalent subcontractor program), as required by DOE Order 440.1A, "Worker Protection Management for DOE Federal and Contractor Employees," and 29 CFR 1910.120 or 1926.65, "Hazardous Waste Operations and Emergency Response." Medical surveillance examinations will be provided before assignment, annually, and after termination of HAZWOPER duties or employment. This includes:

- Personnel who are, or may be, exposed to hazardous substances at or above the OSHA permissible exposure limit (PEL), or published exposure limits, without regard to respirator use for 30 or more days per year

- All employees who are injured, become ill, or develop signs or symptoms because of possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation

- All employees who wear a respirator for 30 days or more a year or as required by "Respiratory Protection" (29 CFR 1910.134).

Personnel who wear a respirator in performance of their job, or who are required to take respirator training to perform their duties under this plan, must participate in the medical evaluation program for respirator use at least annually, as required by MCP-2726 or PRD-2109, "Respiratory Protection."

A single copy of the project HASP, job hazard analysis requirements, required PPE, confined space entry requirements (as applicable), and other exposure-related information will be made available, upon request, to the INEEL OMP physician (and subcontractor physician) conducting medical surveillance for employees participating in this project. Exposure monitoring results and hazard information furnished to the OMP physician will be supplemented or updated annually (as stated in Section 13) as long as the employee is required to maintain a hazardous waste and material employee medical clearance. The OMP physician will then evaluate the physical ability of an employee to perform the work assigned.

A documented medical clearance (e.g., a physician's written opinion) will be provided to the employee and line management stating whether the employee has any detected medical condition that would place him or her at increased risk of health impairment from working in hazardous waste operations, emergency response operations, respirator use areas, and confined space areas, as applicable. The physician may impose restrictions on the employee by limiting the amount and type of work performed.

Personnel are responsible for communicating any work or medical restrictions to their supervisor so modified work assignments can be made if necessary. During the MCP-3003 prejob briefing, the supervisor conducting the briefing should ask workers if they have any work restrictions. However, it is the employee's responsibility to inform the supervisor of any work or medical restrictions.

9.1 Subcontractor Workers

Subcontractor project personnel will participate in a subcontractor medical surveillance program that satisfies the applicable requirements of 29 CFR 1910.120 or 29 CFR 1926.65. This program must make medical examinations available before assignment, annually, and after termination of hazardous waste duties, as stated above. The physician's written opinion, as defined by 29 CFR 1910.120(f)(7), or equivalen will serve as documentation that subcontractor personnel are fit for duty or will list work restrictions.

Medical data from the subcontractor employee’s private physician, collected pursuant to hazardous material worker qualification, will be made available to the INEEL OMP physician on request.

9.2 Injuries on the Site

It is the policy of the INEEL that an INEEL OMP physician examines all injured personnel for the following reasons:

- An employee is injured on the job
- An employee is experiencing signs and symptoms consistent with exposure to a hazardous material
- An employee is believed to have been exposed to toxic substances or physical or radiological agents in excess of allowable limits during the course of a project at the INEEL.

NOTE: In the event of an illness or injury, the decision to provide first aid and transport to the nearest medical facility or whether to immediately request an ambulance and continue to stabilize and provide first aid should be based on the nature of the injury or illness and likelihood that transporting the individual may cause further injury or harm. Most likely, the person making this decision will only be trained to the medic first/CPR level and should contact TAN medical facility (777 or 526-6263) or the CFA medical facility (777 or 526-1515) for further guidance if there is any question as to the extent of injury or potential to cause further harm by movement of the injured individual.

In the event of a known or suspected injury or illness caused by exposure to a hazardous substance or physical or radiological agent, the employee will be transported to the nearest INEEL medical facility for evaluation and treatment, as necessary. The HSO and FTL are responsible for obtaining as much of the following information as is available to accompany the individual to the medical facility:

- Name, job title, work (site) location, and supervisor’s name and phone number
- Substance, physical or radiological agent exposed to (known or suspected), and material safety data sheet, if available
- Nature of the incident and injury or exposure and associated signs or symptoms of exposure
- First aid or other measures taken
- Locations, dates, and results of any relevant personal or area exposure monitoring or sampling
- List of PPE worn during this work (e.g., type of respirator and cartridge used).

Further medical evaluation will be determined by the treating or examining physician in accordance with the signs and symptoms observed, hazard involved, exposure level, and specific medical surveillance requirements established by the OMP director in compliance with 29 CFR 1910.120 or 29 CFR 1926.65.

NOTE: In the event of an illness or injury, subcontractor employees will be taken to the closest INEEL medical facility (if doing so will not cause further injury or harm) or will be transported by INEEL ambulance to have an injury stabilized before transport to the subcontractor’s treating physician or off-Site medical facility.

The TAN shift supervisor and project manager will be contacted if any injury or illness occurs at a project site. As soon as possible after an injured employee has been transported to the INEEL medical facility, the FTL or designee will make notifications as indicated in Section 11.

9.3 Substance-Specific Medical Surveillance

No contaminants (listed in 29 CFR 1910, Subpart Z) with substance-specific standards have been identified at the project site. If new contaminants of concern are identified during the course of project tasks, exposures will be evaluated and quantified to determine if a substance-specific standard and associated medical surveillance requirements apply. If regulatory-mandated, substance-specific standard action levels are triggered, then affected personnel will be enrolled in applicable substance-specific medical surveillance programs.

If new contaminants of concern are identified during the course of project tasks, then exposures will be evaluated and quantified to determine if a substance-specific standard applies. If regulatory mandated, substance-specific standard action levels are triggered, then affected personnel will be enrolled in applicable substance-specific medical surveillance programs.

10. PROJECT ORGANIZATION AND RESPONSIBILITIES

The organizational structure for this project reflects the resources and expertise required to perform the work while minimizing risks to worker health and safety, the environment, and the public. Key project positions, lines of responsibility and communication, and the project within the program structure are shown on the organizational chart (Figure 10-1). The organizational chart is not all-inclusive, but shows the structure for key resources assigned to complete project tasks.

10.1 Key Personnel Responsibilities

The following sections outline responsibilities of key site personnel.

10.1.1 Test Area North Closure Completion Project Director

The TAN Closure Completion project director has ultimate responsibility for the technical quality of all projects, the maintenance of a safe environment, and the safety and health of all personnel during field activities performed by or for the ICP. The project director provides technical coordination and interfaces with the U.S. Department of Energy Idaho Operations Office (DOE-ID). The project director ensures the following:

- Project/program activities are conducted in accordance with the OSHA, DOE, EPA, and Idaho Department of Environmental Quality requirements and agreements

- Program budgets and schedules are approved and monitored to be within budgetary guidelines

- Personnel, equipment, subcontractors, and services are available

- Direction is provided for development of tasks, evaluation of findings, development of conclusions and recommendations, and production of reports.

The TAN Closure Completion project director is also responsible for several functions and processes, including the following:

- Overseeing all work processes and work packages performed at TAN

- Establishing and executing a monthly, weekly, and daily operating plan for TAN

- Executing the Environmental, Safety, Health, and Quality Assurance Program for TAN

- Executing the Integrated Safety Management System for TAN

- Executing the Enhanced Work Planning for TAN

- Executing the VPP at TAN

- Ensuring environmental compliance within TAN

- Executing the portion of the VCO that pertains to TAN

    - Correcting the root cause functions of accident investigations at TAN

- Correcting the root cause functions of the VCO for TAN.

10.1.2 Project Manager

The WAG 1 project manager or designee (e.g., OU 1-10 remedial design/remedial action project manager) will ensure that all project activities are conducted in compliance with the following guidelines and regulations:

- INEEL MCPs and PRDs
- The *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Deactivation, Decontamination, and Decommissioning* (DOE-ID 2004), and the project HASP
- All applicable OSHA, EPA, DOE, U.S. Department of Transportation, and State of Idaho requirements.

The project manager is responsible for the overall work scope, schedule, and budget, including such tasks as the following:

- Developing resource-loaded, time-phased control account plans based on the project's technical requirements, budgets, schedules, and project tasks
- Coordinating all document preparation, field, laboratory, and modeling activities
- Implementing the project requirements and ensuring that work is performed as planned.

The project manager will ensure that employee job function evaluations (INEEL Form 340.02) are completed for all project employees, reviewed by the project IH for validation, and submitted to the OMP for determination of necessary medical evaluations.

Other functions and responsibilities of the project manager include:

- Developing the documentation required to support the project
- Ensuring the technical review and acceptance of all project documentation
- Developing the site-specific plans required by the ICP (such as work plans; environmental, safety, and health plans; and sampling and analysis plans)
- Ensuring that project activities and deliverables meet schedule and scope requirements, as described in the Federal Facility Agreement and Consent Order and Action Plan (DOE-ID 1991a, 1991b) and applicable guidance
- Supporting the CERCLA and National Environmental Policy Act public review and comment processes by identifying their requirements and scheduling and organizing required review and comment activities
- Identifying the subproject technology needs

- Coordinating and interfacing with the units within the program support organization on issues relating to quality assurance; environment, safety, and health; and National Environmental Policy Act support for the project

- Coordinating site-specific data collection, review for technical adequacy, and data input to an approved database

- Coordinating and interfacing with subcontractors to ensure that milestones are met, adequate management support is in place, technical scope is planned and executed appropriately, and project costs are kept within budget.

10.1.3 Health and Safety Officer

The HSO assigned to the task site serves as the primary contact for all health and safety issues. The HSO advises the FTL on all aspects of health and safety and is authorized to stop work at the site if any operation threatens worker or public health and/or safety. As appropriate, the HSO is authorized to verify compliance to the HASP, to conduct conformance inspections and self-assessments, require and monitor corrective actions, and monitor decontamination procedures. The HSO may be assigned other specific responsibilities, as stated in other sections of the project HASP, as long as they do not interfere with the primary responsibilities.

Other environment, safety, and health professionals at the task site—such as the safety engineer, IH, RCT, environmental coordinator, and facility representative—support the HSO as necessary.

Personnel assigned as the HSO, or alternate HSO, must be qualified (in accordance with the OSHA definition) to recognize and evaluate hazards and will be given the authority to take or direct actions to ensure that workers are protected. While the HSO may also be the IH, safety engineer, or, in some cases, the FTL (depending on the hazards, complexity, and size of the activity involved, and required concurrence from the ICP safety and health compliance officer), other task-site responsibilities of the HSO must not conflict (philosophically or in terms of significant added volume of work) with the role of the HSO at the task site.

If it is necessary for the HSO to leave the site, an alternate individual will be appointed by the HSO to fulfill this role, and the identity of the acting HSO will be recorded in the FTL logbook and communicated to task-site personnel.

NOTE: The HSO will ensure that the appropriate Environmental, Safety, Health, and Quality Assurance personnel participate in the development and verification of the hazards screening profile checklist in accordance with relevant INEEL work control processes.

10.1.4 Industrial Hygienist

The IH is the primary source of information regarding nonradiological hazardous and toxic agents at the work site. The IH will be present at the task site during any work operations involving either existing or anticipated chemical hazards to operations personnel.

The IH assesses the potential for worker exposure to hazardous agents in accordance with INEEL procedures and the project HASP, assesses and recommends appropriate hazard controls for protection of work site personnel, reviews the effectiveness of monitoring and PPE required in the project HASP, and recommends changes as appropriate.

Following an evacuation, the IH will assist in determining whether conditions at the task site are safe for reentry. Personnel showing health effects resulting from possible exposure to hazardous agents will be referred to the OMP by the IH, their supervisor, or the HSO. The IH may have other duties at the task site, as specified in other sections of the project HASP, or company procedures and manuals. During emergencies involving hazardous material, members of the Emergency Response Organization will perform industrial hygiene measurements.

10.1.5 Safety Engineer

The assigned safety engineer reviews work packages, observes work site activity, assesses compliance with the project HASP, signs safe work permits, advises the FTL on required safety equipment, answers questions on safety issues and concerns, and recommends solutions to safety issues and concerns that arise at the task site. The safety engineer may conduct periodic inspections and have other duties at the task site as specified in other sections of the project HASP or in PRDs and/or MCPs. Copies of inspections will be kept in the project field file.

10.1.6 Fire Protection Engineer

The assigned fire protection engineer reviews the work packages, conducts preoperational and operational fire hazard assessments, and is responsible for providing technical guidance to site personnel regarding all fire protection issues.

10.1.7 Radiological Control Technician

The RCT is the primary source of information and guidance on radiological hazards that may be encountered during drilling and sampling tasks. The RCT will be present at the task site during any work operations where a radiological hazard to operations personnel may exist or is anticipated. In addition to other possible duties at the site specified in other sections of the project HASP, the PRDs, and/or MCPs, RCT responsibilities include radiological surveying of the work site, equipment, and samples; providing guidance for radiological decontamination of equipment and personnel; and accompanying the affected personnel to the nearest INEEL medical facility for evaluation if significant radiological contamination occurs. The RCT must notify the HSO and FTL of any radiological occurrence that must be reported as directed by PRD-183.

10.1.8 Cognizant Test Area North Facility Manager

The cognizant TAN facility manager for the V-Tanks is responsible for the assigned facility and must be cognizant of work being conducted in the facility. The cognizant TAN facility manager is responsible for the safety of personnel and the safe completion of all project activities. The cognizant TAN facility manager is ultimately responsible for ensuring that operations are conducted within the safety and authorization basis documents. The cognizant TAN facility manager and TAN operations director will be kept informed of all activities performed in the area. The cognizant TAN facility manager and FTL will agree on a schedule for reporting work progress and plans for work. The facility manager may also serve as an advisor to task-site personnel with regard to TAN operations.

10.1.9 Quality Assurance Engineer

The quality assurance engineer provides guidance on task-site quality issues, when requested. The quality assurance engineer observes task site activities, verifies that these operations comply with quality requirements pertaining to these activities, identifies activities that do not comply or have the potential for not complying with quality requirements, and suggests corrective actions.

10.1.10 Field Team Leader

The FTL has ultimate responsibility for the safe and successful completion of the project, and all health and safety issues at the work site must be brought to the FTL's attention. In addition to managing field operations, executing the FSP, enforcing site control, documenting work site activities, and conducting daily safety briefings, the FTL's responsibilities include, but are not limited to, the following:

- Performing the technical and operational requirements of the sampling activities
- Conducting field analysis and decontamination activities
- Complying with equipment removal procedures
- Packaging and shipping samples
- Determining, in conjunction with the site IH and RCT, the level of PPE necessary for the task being performed
- Ensuring compliance with field documentation, sampling methods, and chain-of-custody requirements
- Ensuring the safety of personnel conducting the activities associated with the HASP
- Ensuring the "fit for duty" medical evaluation forms are completed for all project employees, reviewed by the project IH for validation, and then incorporated into the project field file.

The FTL may be a member of the sampling team, and FTL responsibilities may be transferred to a designated representative who satisfies all FTL training requirements.

10.1.11 Field Team Members

All field team members (including field team, sampling team, and subcontractor personnel) will understand and comply with the requirements of the project HASP. The FTL or HSO will conduct a planning meeting briefing at the start of each shift. During the planning meeting briefing, all daily tasks, associated hazards, hazard mitigation (engineering and administrative controls, required PPE, work control documents), and emergency conditions and actions will be discussed. The project HSO, IH, and RCT personnel will provide input to clarify task health and safety requirements, as deemed appropriate. All personnel are encouraged to ask questions regarding site tasks and to provide suggestions for performing required tasks in a more safe and effective manner based on the lesson learned from the previous day's activities.

Once at the site, personnel are responsible for identifying any potentially unsafe situations or conditions to the FTL or HSO for corrective action. If it is perceived that an unsafe condition poses an imminent danger, site personnel are authorized to stop work immediately, then notify the FTL or HSO of the unsafe condition.

10.1.12 Sampling Team Leader

The sampling team leader (STL) reports to the FTL and has ultimate responsibility for the safe and successful completion of assigned project tasks, including:

- Overseeing the sampling team
- Ensuring that the samples are collected from appropriate locations
- Ensuring that proper sampling methods are employed, chain-of-custody procedures are followed, and shipping requirements are met.

If the STL leaves the task site, an alternate individual will be appointed to act in this capacity. An acting STL on the task site must meet all the same training requirements as the FTL, as outlined in the project HASP. The identity of the acting STL shall be conveyed to task-site personnel, recorded in the daily force report, and communicated to the FTL and TAN site area director, or designee, when appropriate. The STL may also be the FTL for the sampling event.

10.1.13 Sampling Team

The sampling team will consist of a minimum of two members (including the STL) who will perform the onsite tasks necessary to collect the samples. The buddy system will be implemented for all tasks; no team member will enter the contamination zone alone. The members of the sampling team will be led by a FTL, who may also serve as the project STL. The IH and RCT will support the sampling team, as warranted, based on sight-specific hazards and task evolutions.

10.1.14 Nonfield Team Members/Visitors

All persons on the work site who are not part of the field team (e.g., surveyor, equipment operator, or other craft personnel not assigned to the project) are considered nonfield team members or visitors for the purposes of this project. A person will be considered "onsite" when they are present in or beyond the designated support zone. Under 29 CFR 1910.120 and 29 CFR 1926.65, nonfield team members are considered occasional site workers and must comply with the following:

- Check in with the TAN shift supervisor
- Receive any additional site-specific training identified in the HASP prior to entering beyond the support zone of the project site
- Meet all required training based on the tasks taking place, as identified in the HASP
- Meet minimum training requirements for such workers as described in the OSHA standard
- Meet the same training requirements as the workers if the nonworkers' tasks require entry into the work control zone.

Training must be documented and a copy of the documentation must be incorporated into the project field file. A site supervisor (e.g., HSO or FTL) will supervise all nonfield team personnel who have not completed their 3 days of supervised field experience in accordance with the hazardous waste operations standard.

NOTE: Visitors may not be allowed beyond the support zone during certain project site tasks (drilling) to minimize safety and health hazards. The determination as to any visitor's "need" for access beyond the support zone at the project site will be made by the HSO in consultation with TAN RadCon personnel (as appropriate).

10.1.15 Waste Generator Services

Waste Generator Services will perform waste disposition for this project.

10.2 Points of Contact

Table 10-1 lists the key points of contact for the TAN, WAG 1, OU 1-10 field activities conducted at the soil contamination area south of the turntable (TSF-06, Area B) and the PM-2A tanks (TSF-26). The points of contact listed in the table are those expected to be contacted as a part of sampling operations. An exhaustive contact list of all personnel with responsibilities listed in Section 10.1 is not provided.

Table 10-1. Points of contact.

Name	Title	Telephone Number
Al Jantz	WAG 1 Project Manager	526-8517
Dave Eaton	WAG 1 Environmental Compliance	526-7002
Gary McDannel	WAG 1 Project Engineer	526-5076
Lynn Schwendiman	TAN V-Tank Area New Sites Task Lead	526-8732
John Harris/Marshall Marlor	Waste Generator Services Contact	526-3461/526-2581
Robert Miklos	TAN Clean and Close Project Director	526-4072
TBD	Health and Safety Officer	TBD
Lynn Schwendiman	Field Team Leader/Engineer	526-8732
Kori Hatch/Jeremy Sawyer	Industrial Hygienist	526-9877/526-5213
B. P. Shagula	Safety Engineer	526-0580
Bruce Hendrix	Fire Protection Engineer	526-7989
James Brady	Radiological Control Engineer	526-6944
Al Millhouse	Cognizant TAN Facility Manager	526-6932
James K. Rider	Quality Assurance Engineer	526-2534
Donna Haney	Sampling Team Leader	526-7050
Tracy Elder	Sample Analysis Management Contact	526-9873

TAN = Test Area North
TBD = to be determined
WAG = waste area group

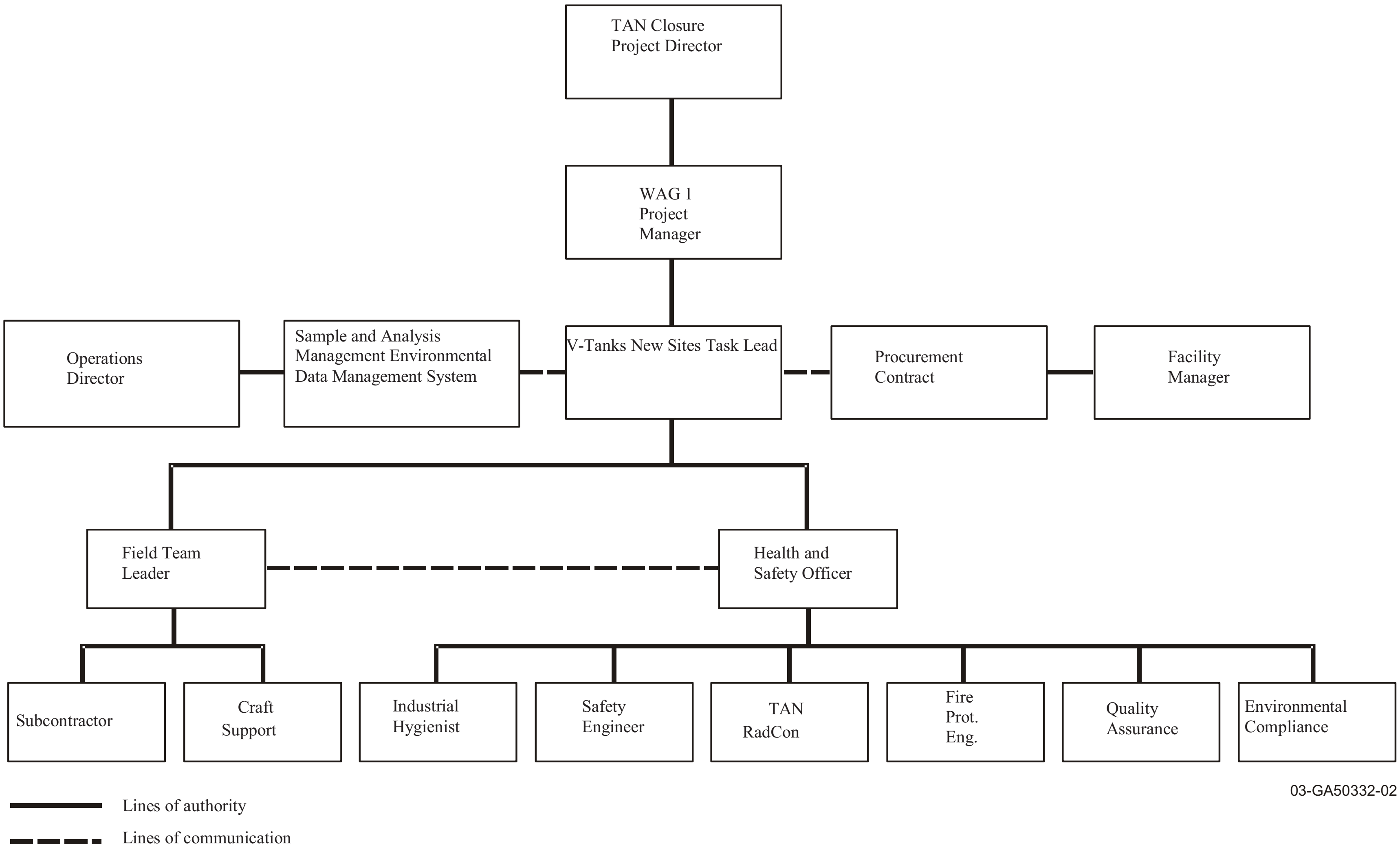

Figure 10-1. Organization chart.

11. EMERGENCY RESPONSE PLAN

This emergency response plan defines the roles and responsibilities of project personnel during an emergency. Such an emergency could be at the project site, on a tenant facility or collocated facility, or a Sitewide emergency. This section provides details of the INEEL Emergency Response Organization and "INEEL Emergency Plan/RCRA Contingency Plan" (PLN-114) information. Plan (PLN) -114 describes the overall process developed to respond to and mitigate consequences of emergencies that might arise at the INEEL.

In addition, PLN-114 may be activated in response to events occurring at the project site, at the INEEL, or at the discretion of the emergency coordinator or emergency action manager. Once the INEEL plan is activated, project personnel will follow the direction and guidance communicated by the emergency coordinator.

NOTE: The OSHA HAZWOPER definition of an emergency is not defined the same as classified by DOE Orders 151.1B, "Comprehensive Emergency Management System," and 231.1A, "Environment, Safety, and Health Reporting." For this reason, the term "event" will be used in this section when referring to project HAZWOPER emergencies.

11.1 Pre-Emergency Planning

The "INEEL Emergency/Plan RCRA Contingency Plan" (PLN-114) provides the basis for preplanning all INEEL emergency events. This base plan is supplemented with INEEL facility-specific addendums. This preplanning makes it possible for the project to anticipate and appropriately respond to abnormal events that can affect project activity. Preplanning also ensures that the project emergency response program is integrated with that of the INEEL. Specific procedures for addressing emergency events and actions to be taken are further described in the facility-specific emergency implementing procedures. Finally, the HASP addresses project-specific hazards, potential emergency events, and the actions to take following such events.

11.2 Emergency Preparation and Recognition

The sections for hazards identification and mitigation and accident prevention provided the strategy that will be followed at the project site to prevent accidents. Similarly, emergency preparation and recognition also will require project personnel to be constantly alert for potentially hazardous situations and signs and symptoms of chemical exposure or releases. All field personnel should be familiar with the techniques for hazard recognition and the assigned action levels and associated actions to be taken as identified in Section 4.

The requirements in MCP-2725, "Field Work at the INEEL," for training, emergency actions, and notifications will be followed for all projects conducted outside facility boundaries as described in MCP-2725.

Preparation and training on emergencies will include proper site access and egress procedures in response to project events and INEEL emergencies as part of the project-specific HASP training and facility access training where applicable. Visitors also will receive this training on a graded approach based on their site access requirements. Visitor training will include alarm identification, location and use of communication equipment, location of site emergency equipment, and evacuation. Emergency phone numbers and evacuation route maps will be located in the project trailer.

On-scene response to, and mitigation of, site emergencies could require the response from both project personnel and INEEL fire department personnel. Emergencies could include the following scenarios:

- Accidents resulting in injury
- Fires
- Spills of hazardous or radiological materials
- Tornadoes, earthquakes, or other adverse natural phenomena
- Vehicle or transportation emergencies
- Safeguard and security emergencies
- Emergencies at nearby facilities that could prompt evacuation or take-cover actions at the task site.

11.3 Emergency Alerting, Responses, and Sheltering

11.3.1 Alarms

Alarms and signals are used at the project site and the INEEL to notify personnel of abnormal conditions that require a specific response. Responses to these alarms are addressed in general employee training. Emergency sirens located throughout the INEEL serve as the primary means for signaling emergency TAKE COVER or EVACUATION protective actions. To signal site personnel of a project-initiated emergency event, a separate set of emergency signals has been established based on horn blasts (e.g., vehicle or air horn).

Depending on the field location (within or outside a facility), facility alarms may not be able to be heard at the project site. If the project site is outside the audible range of the facility alarms, then the notification to take cover or evacuate should be received on the field radio. The project signals will then be used to alert personnel of the emergency actions. Radio contact is required when working in the field.

11.3.1.1 Take Cover—Continuous Siren. Radiation or hazardous material releases, adverse weather conditions, or other event or emergency conditions may require that all personnel take cover indoors in the nearest building. A TAKE COVER protective action may be initiated as part of a broader response to an emergency situation and may precede an evacuation order. The order to TAKE COVER is usually announced by activating the emergency siren. The signal to take cover is a CONTINUOUS SIREN.

STEADY = STAY

However, the order to take cover also can be given by word of mouth, radio, or voice paging system. When ordered to TAKE COVER, project personnel will place the site and equipment in a safe configuration (as appropriate) and then seek shelter in TAN-607 or a vehicle (if outside the facility). Eating, drinking, and smoking are not permitted during take-cover conditions.

11.3.1.2 Total Area Evacuation—Alternating Siren. A total area evacuation is the complete withdrawal of personnel from the project site and the entire facility area. The evacuation signal is an ALTERNATING SIREN. When ordered to EVACUATE, project personnel will place equipment and the site in a safe configuration (as appropriate) and then proceed along the specified evacuation route (see Figure 11-1) to the designated assembly area or as directed by the emergency coordinator.

ALTERNATE = EVACUATE

For total area evacuations, the facility command post is activated and all personnel will gather at the primary facility evacuation assembly area or the location designated by the emergency coordinator or FTL if outside a facility. The FTL or trained alternate will then complete the personnel accountability using the attendance log. In this situation, the project area warden will report the result of the accountability process to the facility emergency coordinator.

11.3.1.3 Local Area Evacuation—Vehicle Horn Blast. A local area evacuation is the complete withdrawal of personnel from the project site, but it does not require the complete evacuation of the entire facility or INEEL area. A single long horn blast (e.g., vehicle) will serve as the project's primary emergency evacuation signal (as listed on Table 11-1). However, the order to evacuate also can be given by word of mouth, radio, or voice paging system. When ordered to evacuate the project site, personnel will place the site in a safe condition (as appropriate) and then proceed along the specified evacuation route to the assembly area designated for local area evacuations or as directed by the FTL. Eating, drinking, and smoking are not permitted during emergency evacuations.

Table 11-1. Project internal emergency signals.

Device or Communication Method	Signal and Associated Response
Vehicle horn blasts	**One long blast**—Emergency evacuation, evacuate project site immediately. Proceed in an upwind direction to designated assembly area as specified by the FTL. **Two short blasts**—Nonemergency evacuation of immediate work area. Proceed to designated assembly area as specified by the FTL. **Three long blasts** or verbally communicated—All clear, return to project site.

FTL = field team leader

11.4 Personnel Roles, Lines of Authority, and Training

11.4.1 The Idaho National Engineering and Environmental Laboratory Emergency Response Organization

The INEEL Emergency Response Organization structures are based on the Incident Command System and are described in PLN-114 and facility-specific addendums to that plan.

11.4.2 Role of Project Personnel in Emergencies

Depending on the event, a graded response and subsequent notifications will take place. The FTL and project personnel responsibilities are described in the following subsections. Personnel will respond to emergencies only within the limits of their training and designated by their position. All personnel are trained to the facility-specific emergency actions as part of the access training or will be escorted by someone who has been trained. Emergency response actions also will be covered as part of the HASP briefing as stated in Table 7-1.

11.4.2.1 Field Team Leader. The FTL (or designated alternate) is responsible for initiating all requests for emergency services (e.g., fire and medical) and for notifying the TAN shift supervisor of abnormal (or potential emergency) events that may occur during the project. The FTL may also serve as the area warden (or designate that responsibility to another person who has been trained as area warden) and conduct personnel accountability. Personnel accountability will then be reported to the shift supervisor. Additionally, the FTL will control the scene until a higher-tiered Incident Command System authority arrives at the scene to take control. When relinquishing this role, the FTL (or designated alternate) will provide all information about the nature of the event, potential hazards, and other information requested.

11.4.2.2 Project Personnel. Every person at the project site has a role to play during a project event or INEEL emergency. Each employee must be constantly aware of potential problems or unexpected hazardous situations and immediately report these situations to the FTL. All personnel are expected to watch out for their fellow workers, to report their concerns to the FTL, and to take emergency actions as described in this section. Roles and responsibilities are further detailed in Table 11-2.

Table 11-2. Responsibilities during an emergency.

Responsible Person	Action Assigned
Field team leader (or designee)	Signal evacuation.
	Report spill to shift supervisor and take mitigative actions.[a]
	Contact shift supervisor or Warning Communications Center (if the shift supervisor cannot be contacted).
Field team leader (or trained designee)	Serve as area warden, conduct accountability, and report to shift supervisor.
Health and safety officer and medic and first-aid trained personnel	Administer first aid to victims (voluntary basis only).

a. The environmental affairs spill response categorization and notification team will be contacted by the shift supervisor or emergency coordinator.

11.4.2.3 Personnel Accountability and Area Warden. Project personnel are required to evacuate the site in response to TAKE COVER, EVACUATION, and local evacuation alarms. In all cases, the FTL (or trained designee) will account for the people present on the project site. The FTL (or trained alternate) will serve as the area warden for the project and will complete the personnel accountability (following positive sweeps of the project site) based on the attendance log. The results of this accountability will then be communicated to the FTL for reporting to the shift supervisor or emergency coordinator (if the command post has been formed).

11.4.2.4 Spills. If the material spilled is known, and is small enough to be safely contained at the task site, task-site personnel will handle spill control using spill supplies at the site and immediately report the incident to the shift supervisor or WCC if the shift supervisor cannot be contacted. Reporting requirements will be determined by the facility emergency coordinator in accordance with MCP-190, "Event Investigation and Occurrence Reporting." If any release of a hazardous material occurs, task site personnel will comply with the following immediate spill response actions.

11.4.2.4.1 Untrained Initial Responder—The requirements for the untrained initial responder (or if the material characteristics are unknown) are listed below:

- Place equipment in a safe configuration
- Evacuate and isolate the immediate area
- Notify and then seek help from and warn others in the area
- Notify the FTL.

11.4.2.5 Trained Responder. The requirements for the trained responder where material characteristics are known and no additional PPE is required are listed below:

- Place all equipment in a secure configuration
- Seek help from and warn others in the area
- Stop the spill if it can be done without risk (e.g., returning the container to the upright position, closing valve, and shutting off power)
- Provide pertinent information to the FTL
- Secure any release paths if safe to do so.

11.5 Medical Emergencies and Decontamination

Medical emergencies and responses to injuries or suspected exposures will be handled as stated in Section 9.2. Decontamination of personnel and equipment is described in Section 12.2.

11.6 Emergency Communications

In the event of an emergency, the capability to summon INEEL emergency response resources to immediately notify site personnel and inform others of site emergencies is required. Communications equipment at the task site will be a combination of radios, telephones (e.g., mobile, cellular, or facility), and pagers. Communication methods described below will be used during emergency situations.

11.6.1 Notifications

During emergency situations, the facility shift supervisor will be notified of any project emergency event. The shift supervisor will then make the required Emergency Response Organization notification. The following information should be communicated, as available, to the shift supervisor:

NOTE: If the shift supervisor cannot be contacted, then the WCC will be notified of the event and the information listed below communicated. The WCC also must be told that notification to the facility shift supervisor and emergency coordinator has not been made.

- The caller's name, title (e.g., FTL or HSO), telephone number, and pager number
- Exact location of the emergency

- Nature of the emergency, including time of occurrence, current site conditions, and special hazards in the area
- Injuries (if any) including numbers of injured, types of injuries, and conditions of injured
- Emergency response resources required (e.g., fire, hazardous material, and ambulance)
- Additional information as requested.

11.7 Emergency Facilities and Equipment

Emergency response equipment maintained at the project site includes the items listed in Table 11-3. The TAN facility-specific addendum to PLN-114 lists emergency equipment available at the facility. This includes the command post, self-contained breathing apparatus, dosimeters, air samplers, decontamination and first-aid equipment, and an emergency response trailer. The INEEL fire department maintains an emergency hazardous material response van that can be used to respond to an event or emergency at the project. Fire department personnel also are trained to provide immediate hazardous material spills and medical services. Additionally, the CFA-1612 medical facility is manned by medical personnel to evaluate and stabilize injured personnel or those experiencing signs and symptoms of exposure. The FTL will check all emergency equipment prior to work and will record the information in his logbook.

Table 11-3. Emergency response equipment to be maintained at the project site during operations.

Equipment Name and Quantity Required	Location at Task Site	Responsible Person	Frequency of Inspection or Verification[a]
First-aid kit	Project vehicle or near DWA or CWA	HSO	Monthly: check seal only unless broken
Eyewash bottles[b] Eyewash station[b]	In or near DWA or CWA	HSO	Monthly
Hazardous materials spill kit	Project vehicle	HSO	Daily verification
Extra personal protective equipment	Project vehicle or support trailer	HSO	Daily verification
Communication equipment (operational)	Onsite	Field team leader	Daily radio check
Fire extinguishers[c]	In or near DWA or CWA	HSO	Monthly

a. This is verification that equipment is present at the project location before starting tasks and no inspection tag is required.

b. An eyewash bottle will be used to provide an immediate eye flush if required. The location of the eyewash station will be identified by the HSO during the prejob briefing.

c. A minimum of one 10A/60BC extinguisher is required. If it is discharged, it will be returned for servicing and recharging.
CWA = controlled work area
DWA = designated work area
HSO = health and safety officer

11.8 Evacuation Assembly Areas and Test Area North Medical Facility

The TAN Facility maintains primary and secondary evacuation routes and assembly areas. These routes may be used in response to a total facility area evacuation as directed by the emergency coordinator. Copies of the evacuation assembly areas (Figure 11-1) will be available at the project site.

NOTE: If the project is conducted outside of a facility, then the INEEL evacuation routes listed in PLN-114 will be used.

11.9 Reentry, Recovery, and Site Control

All reentry and recovery activities will follow general site security and control requirements identified in Section 8 unless conducted as part of an emergency response action. All entries to the project site performed in support of emergency actions will be controlled by the on-scene commander.

11.9.1 Reentry

During an emergency response, it is sometimes necessary to reenter the scene of the event. Reasons for performing a reentry may include:

- Performing personnel search and rescues
- Responding to medical first-aid needs
- Performing safe shutdown actions
- Performing mitigating actions
- Evaluating and preparing damage reports
- Performing radiation or hazardous material surveys.

Reentries will be carefully planned to ensure that personnel are protected from harm and to prevent initiating another emergency event. Reentry planning is undertaken as a graded approach depending on the nature of the initiating event.

11.9.2 Recovery

After the initial corrective actions have been taken and effective control established, response efforts will shift toward recovery. Recovery is the process of assessing post-event and post-emergency conditions and developing a plan for returning to pre-event and pre-emergency conditions, when possible, and following the plan to completion. The emergency coordinator and emergency action manager are responsible for determining when an emergency situation is sufficiently stable to terminate the emergency and enter the recovery phase. The project manager, with concurrence from the TAN facilities manager, will appoint the recovery manager.

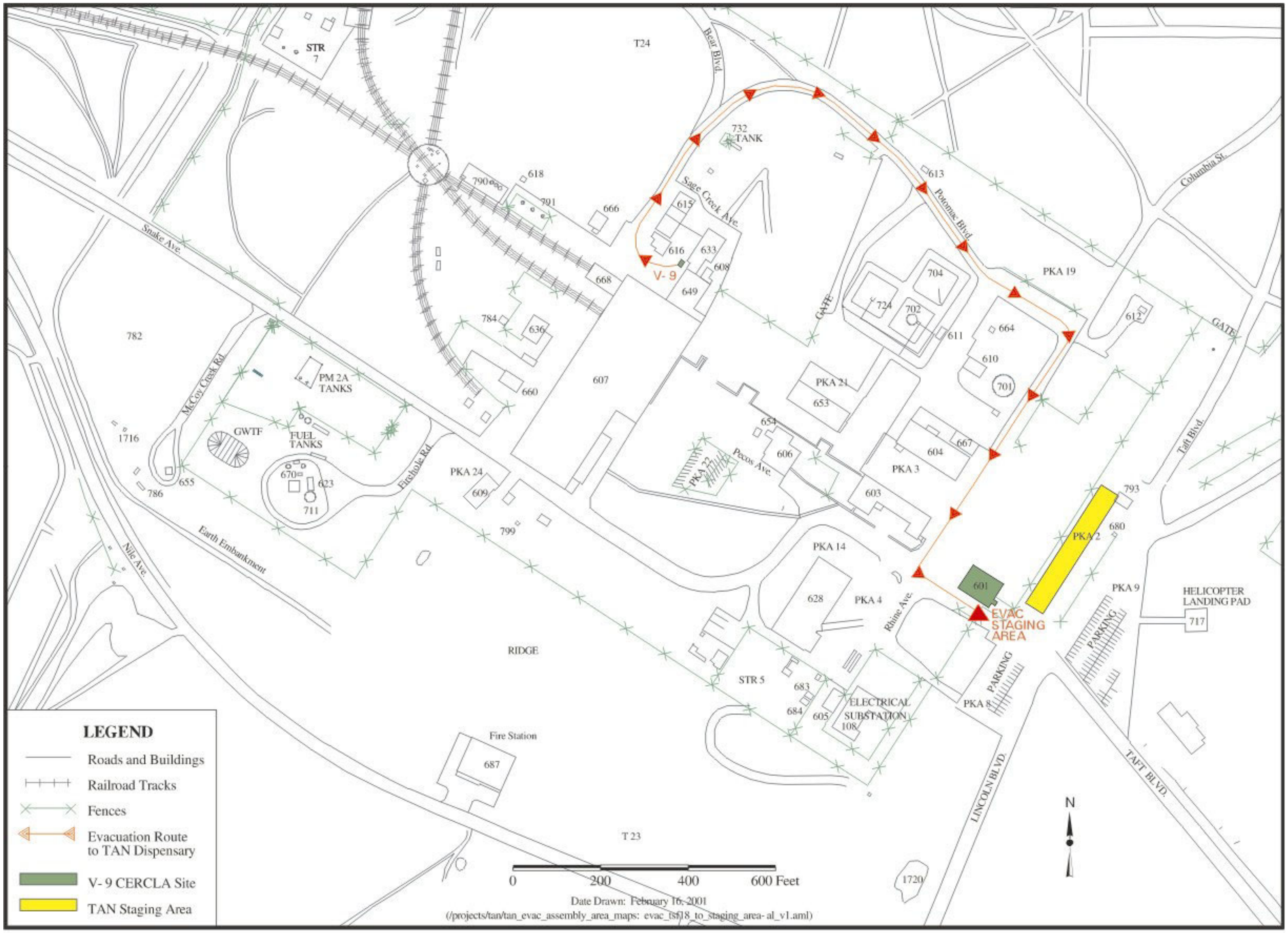

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Figure 11-1. Primary evacuation routes for the V-Tank Area New Sites sampling and remediation project.

11.10 Critique of Response and Follow-up

A review and critique will be conducted following all emergency events, drills, and exercises at the INEEL. In some cases, an investigation might be required before commencing recovery actions. For this reason, care should be exercised to preserve evidence when appropriate.

11.11 Telephone and Radio Contact Reference List

Table 10-1 lists the points of contact for the project. A copy of this list will be kept in the FTL logbook. Because personnel listed may change frequently, working copies of this list will be generated as required to note new positions and changes of personnel assigned. This HASP should not be revised with a DAR to note these changes. Table 11-4 below is the project emergency contact list.

Table 11-4. Project emergency contact list.

Name	Title	Telephone Number
Al Jantz	WAG 1 Project Manager	526-8517
Dave Eaton	WAG 1 Environmental Compliance	526-7002
Gary McDannel	WAG 1 Project Engineer	526-5076
Lynn Schwendiman	TAN V-Tank Area New Sites Task Lead	526-8732
John Harris/Marshall Marlor	Waste Generator Services Contact	526-3461/526-2581
Robert Miklos	TAN Clean and Close Project Director	526-4072
TBD	Health and Safety Officer	TBD
Lynn Schwendiman	Field Team Leader/Engineer	526-8732
Kori Hatch/Jeremy Sawyer	Industrial Hygienist	526-9877/526-5213
B. P. Shagula	Safety Engineer	526-0580
Bruce Hendrix	Fire Protection Engineer	526-7989
James Brady	Radiological Control Engineer	526-6944
Al Millhouse	Cognizant TAN Facilities Manager	526-6932
James K. Rider	Quality Assurance Engineer	526-2534
Donna Haney	Sampling Team Leader	526-7050
Tracy Elder	Sample Analysis Management Contact	526-9873

TAN = Test Area North
TBD = to be determined
WAG = waste area group

12. DECONTAMINATION PROCEDURES

Every effort will be made to prevent contamination of personnel and equipment through the use of engineering controls, isolation of source materials, contaminant monitoring, personnel contamination control training, and by following material handling requirements and procedures for contaminated or potentially contaminated materials. If contact with potentially contaminated surfaces cannot be avoided, then additional engineering controls, in combination with PPE upgrades, may be necessary to control the contact hazard. However, if chemical or radiological contamination is encountered at levels requiring decontamination, this section provides guidance on how it will be performed.

12.1 Contamination Control and Prevention

Contamination control and prevention procedures will be implemented to minimize personnel contact with contaminated surfaces if such surfaces are encountered or may be contacted during project tasks. The following contamination control and prevention measures will be employed if contamination is encountered or anticipated:

- Identify potential sources of contamination and design containment, isolation, and engineering controls to eliminate or mitigate any potential for contact or release of contaminants
- Limit the number of personnel, equipment, and materials that enter the contaminated area
- Implement immediate decontamination procedures to prevent the spread of contamination (if contamination is found on the outer surfaces of equipment)
- Use only the established control entry and exit point from the contaminated area to minimize the potential for cross-contamination and expedite contamination control surveys
- Wear disposable outer garments and use disposable equipment (where possible)
- Use hold points defined in procedures and work orders to monitor for contamination where anticipated.

12.2 Equipment and Personnel Decontamination

Personnel and equipment decontamination procedures are necessary to control contamination and to protect personnel should contamination be encountered. Both chemical and radioactive material contamination will be decontaminated from surfaces of a contaminated area at the exit and other designated work area boundaries.

If radioactive material decontamination operations are required for equipment or areas, they will be performed in accordance with Chapter 4 of the INEEL "Radiological Control Manual" (PRD-183). Nonradioactive material decontamination will be evaluated by the HSO and project IH on a case-by-case basis to determine the most appropriate level of PPE to be worn. An RWP will be generated if radioactive material contamination is encountered.

12.2.1 Equipment Decontamination

Decontamination of sampling equipment will be conducted in accordance with GDE-140, "Decontaminating Sampling Equipment." If contact with potentially contaminated surfaces cannot be avoided, then additional engineering controls in combination with PPE upgrades might be necessary to control the contact hazard. Equipment will be decontaminated based on the source of contamination.

If radioactive material decontamination operations are required for equipment or areas, they will be performed in accordance with Chapter 4 of the INEEL "Radiological Control Manual" (PRD-183). Nonradioactive material decontamination will be evaluated on a case-by-case basis by the HSO and project IH to determine the most appropriate PPE. (Level C protective clothing will initially be selected if airborne contaminants may be generated until site monitoring can demonstrate downgrading is warranted.) This will be documented in the RWP.

A decontamination pad may be established if nonradioactive material decontamination is required before equipment can be released. If it is deemed necessary and appropriate by the project IH, then a wet wipe with an amended water solution (e.g., amended with a nonphosphate detergent such as Alconox) or a potential steam cleaning of this equipment may be conducted before it is allowed to leave the decontamination area. A drainage system that allows for a single collection point will be established if steam cleaning is performed. Decontamination wastewater will be collected using a submergible pump and containerized and characterized in accordance with companywide *Manual 17— Waste Management* and relevant MCPs.

12.2.2 Personnel Decontamination

Project activities will be conducted in Level D PPE unless upgrading is warranted. Engineering controls in conjunction with work controls and proper handling of samples will serve as the primary means to eliminate the need for personnel decontamination. If modified Level D protective clothing is required, all items will be inspected following the list in Section 6.

Project tasks initially will be conducted in Level D or modified Level D PPE unless upgrading is warranted. Engineering controls, in conjunction with project contamination prevention and control practices and proper protective clothing donning and doffing procedures, will serve as the primary means to eliminate the need for personnel decontamination. Before donning PPE, all items will be inspected, following the list in Table 6-3. Following the donning of protective clothing, the FTL, HSO, or RCT will check to verify the donning technique has been performed properly.

The modified Level D PPE selection, as identified in the RWP, will provide for the layered barriers required to minimize external surface contact with potentially contaminated surfaces. The options for the outermost protective clothing layer (e.g., Tyvek QC or Saranex-23C) will depend on the likelihood for deposition of contaminants and the specific tasks.

12.2.3 Decontamination in Medical Emergencies

If a person is injured or becomes ill, that person will be immediately evaluated by first-aid-trained personnel (on a voluntary basis) at the project task site. If the injury or illness is serious, then the FTL will contact the TAN shift supervisor or WCC (if the shift supervisor cannot be reached) to summon emergency services (i.e., fire department and medical services) to the project site.

Medical care for serious injury or illness will not be delayed for decontamination. In such cases, gross decontamination may be conducted by removing the injured person's outer protective clothing (if possible) and other contaminated areas may be contained with a bag or glove. If contaminated PPE cannot be removed without causing further injury (except for the respirator, which must be removed), the individual will be wrapped in plastic, blankets, or other available material to help prevent contaminating the inside of the ambulance, medical equipment, and medical personnel.

The IH or the RCT (depending on the type of contamination) will accompany the employee to the medical facility to provide information and decontamination assistance to medical personnel. Contaminated PPE then will be removed at the medical facility and carefully handled to prevent the spread of contamination. *Manual 15B—Radiation Protection Procedures*, Chapter 5, and MCP-148, "Personnel Decontamination," contains information on proper handling of radioactive material contaminated wounds.

12.3 Doffing Personal Protective Equipment and Decontamination

As stated earlier, no personnel decontamination beyond doffing of PPE is anticipated for this project. Careful removal of the outer PPE will serve as the primary decontamination method.

The specific doffing sequence of modified Level D or C PPE, and associated decontamination procedures, will be based on the nature of the contamination. A general approach for doffing modified Level D or C PPE is described below. However, no one doffing strategy works for all circumstances. Modifications to this approach are appropriate if site conditions change or at the discretion of the project HSO in consultation with the project IH and RCT.

12.3.1 Modified Level D Personal Protective Equipment Doffing and Decontamination (if required)

Modified Level D protective clothing (e.g., disposable coveralls), if required to be worn, will be doffed following standard radiological removal techniques and will constitute the initial decontamination step. All PPE will be placed in the appropriately labeled containers.

12.3.2 Level C Personal Protective Equipment Doffing and Decontamination (if required)

If respiratory protection is worn in conjunction with protective clothing (e.g., Level C PPE), then the modified Level D sequence will be followed with one additional step. That additional step is to remove the respirator and place it in a separate container from the discarded protective clothing. Depending on the type of contamination encountered, this step will be followed by a radiological survey or IH evaluation.

12.4 Personnel Radiological Contamination Monitoring

An automated whole-body radiological survey may be required before exiting the project site, as determined appropriate by RadCon personnel or as stated in the RWP. If required, this survey will be conducted using an existing personnel contamination monitor or other available hand-held instrument as directed by RadCon personnel.

12.4.1 Site Sanitation and Waste Minimization

Site personnel will use the portable toilet facilities provided in the TAN area. Waste materials will not be allowed to accumulate at routine monitoring sites. Appropriately labeled containers for industrial waste and CERCLA waste (as required) will be maintained at the project site, as stated in the "Waste Management Plan for the V-Tank Area New Sites, for Test Area North, Waste Area Group 1, Operable Unit 1-10 (Draft) (see footnote c). Personnel should make every attempt to minimize waste through the judicious use of consumable materials. All site personnel are expected to make good housekeeping a priority at the job site.

13. RECORDKEEPING REQUIREMENTS

13.1 Industrial Hygiene and Radiological Monitoring Records

When industrial hygiene support is required, the IH will record airborne monitoring and sampling data (both area and personal) collected for exposure assessments in the INEEL Hazards Assessment and Sampling System database. All monitoring and sampling equipment will be maintained and calibrated in accordance with INEEL procedures and manufacturer specifications. Industrial hygiene airborne monitoring and sampling exposure assessment data are treated as limited access information and maintained by the IH in accordance with INEEL companywide safety and health manual procedures.

The RCT maintains a logbook of radiological monitoring, daily project operational activities, and instrument calibrations. Radiological monitoring records are maintained in accordance with companywide *Manual 15B—Radiation Protection Procedures*.

Project personnel or their representatives have a right to the monitoring and sampling data (both area and personal) from both the IH and the RCT. Results from monitoring data also will be communicated to all field personnel during daily planning meetings and formal prejob briefings, in accordance with MCP-3003, “Performing Pre-Job Briefings and Documenting Feedback.”

13.2 Field Team Leader and Sampling Logbooks

Logbooks will be maintained in accordance with MCP-1194, “Logbook Practices for ER and D&D&D Projects.” Logbooks must be obtained from the field data coordinator for the INEEL Sample and Analysis Management Program. The completed logbooks must be returned to the INEEL Sample and Analysis Management Program within 6 weeks of project completion. The logbooks are then submitted to ICP Document Control.

13.3 Idaho Completion Project Document Control

The ICP Document Control organizes and maintains data and reports generated by ICP field activities. The ICP Document Control maintains a supply of all controlled documents and provides a documented system for the control and release of controlled documents, reports, and records. Copies of the project plans for ICP, this HASP, PLN-694, the *Quality Assurance Project Plan for Waste Area Group 1, 2, 3, 4, 5, 6, 7, 10, and Deactivation, Decontamination, and Decommissioning* (DOE-ID 2004), and other project-specific documents are maintained in the project file by ICP Document Control.

Completed sample logbooks are submitted to the Sample and Analysis Management Program within 6 weeks of project completion. All other project records and logbooks, except industrial hygiene logbooks, must be forwarded to the Administrative Record and Document Control within 30 days after completion of field activities.

13.4 Site Attendance Record

If required to be maintained separately, the site attendance record will be used to keep a record of all personnel (i.e., field team members and nonfield team members) onsite each day and to assist the area warden with conducting personnel accountability should an evacuation take place (see Section 11 for emergency evacuation conditions). Personnel will only be required to sign in and out of the attendance record once each day. The FTL is responsible for maintaining the site attendance record and for ensuring that all personnel on the project site sign in (if required).

13.5 Administrative Record and Document Control Office

The Administrative Record and Document Control (ARDC) will organize and maintain data and reports generated by ICP field activities. The ARDC maintains a supply of all controlled documents and provides a documented system for the control and release of controlled documents, reports, and records. Copies of the management plans for the ICP, this HASP, PLN-694*,* the Quality Assurance Project Plan (DOE-ID 2004), and other documents pertaining to this work are maintained in the project file by the ARDC.

14. REFERENCES

10 CFR 835, 2002, "Occupational Radiation Protection," *Code of Federal Regulations*, Office of the Federal Register, February 2002.

10 CFR 835.603b, 2002, "High Radiation Area," *Code of Federal Regulations*, Office of the Federal Register, February 2002.

10 CFR 835.603d, 2002, "Airborne Radioactive Area," *Code of Federal Regulations*, Office of the Federal Register, February 2002.

29 CFR 1910, Subpart Z, 2004, "Toxic and Hazardous Substances," *Code of Federal Regulations,* Office of the Federal Register, June 2004.

29 CFR 1910.120, 2004, "Hazardous Waste Operations and Emergency Response," *Code of Federal Regulations*, Office of the Federal Register, June 2004.

29 CFR 1910.132, 2004, "General Requirements," *Code of Federal Regulations*, Office of the Federal Register, June 2004.

29 CFR 1910.134, 2004, "Respiratory Protection," *Code of Federal Regulations*, Office of the Federal Register, June 2004.

29 CFR 1910.1000, 2004, "Air Contaminants," *Code of Federal Regulations*, Office of the Federal Register, June 2004.

29 CFR 1926, Subpart B, 2004, "General Interpretations," *Code of Federal Regulations,* Office of the Federal Register, June 2004.

29 CFR 1926, Subpart P, 2004, "Excavations," *Code of Federal Regulations*, Office of the Federal Register, June 2004.

29 CFR 1926.65, 2004, "Hazardous Waste Operations and Emergency Response," *Code of Federal Regulations*, Office of the Federal Register, June 2004.

40 CFR 300, 2004, "National Oil and Hazardous Substances Pollution Contingency Plan," *Code of Federal Regulations*, Office of the Federal Register, June 2004.

54 FR 48184, 1989, "National Priorities List of Uncontrolled Hazardous Waste Sites; Final Rule," *Federal Register*, November 1989.

42 USC § 6901 et seq., 1976, "Resource Conservation and Recovery Act (Solid Waste Disposal Act)," *United States Code*, October 21, 1976.

42 USC § 9601 et seq., 1980, "Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA/Superfund)," *United States Code,* December 11, 1980.

ACGIH, 2002, *Threshold Limit Values Booklet*, American Conference of Governmental Industrial Hygienists.

ANSI Z41, 1999, “User Guide and Protective Footwear Standard Combination Set,” American National Standards Institute, January 1, 1999.

ANSI Z87.1-2003, 2003, “Practice for Occupational and Educational Eye and Face Protection,” American National Standards Institute, June 19, 2003.

ANSI Z89.1-2003, 2003, “Personal Protection—Protective Headwear for Industrial Workers,” American National Standards Institute.

DOE O 151.1B, 2003, “Comprehensive Emergency Management System,” U.S. Department of Energy, October 29, 2003.

DOE O 231.1A, 2004, “Environment, Safety, and Health Reporting,” Change 1, U.S. Department of Energy, June 3, 2004.

DOE O 440.1A, 1998, “Worker Protection Management for DOE Federal and Contractor Employees,” U.S. Department of Energy, March 1998.

DOE-ID, 1991a, *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory,* Administrative Docket No. 1088-06-29-120, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Department of Health and Welfare, December 4, 1991.

DOE-ID, 1991b, *Action Plan for Implementation of the Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory,* Administrative Docket No. 1088-06-29-120, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Department of Health and Welfare, December 1991.

DOE-ID, 1997, *Comprehensive Remedial Investigation/Feasibility Study for the Test Area North Operable Unit 1-10 at the Idaho National Engineering and Environmental Laboratory*, DOE/ID-10557, Rev. 0, U.S. Department of Energy Idaho Operations Office, November 1997.

DOE-ID, 1998, *Proposed Plan for Waste Area Group 1 - Test Area North, Idaho National Engineering and Environmental Laboratory*, Document Number 10553, U.S. Department of Energy Idaho Operations Office, U.S. Environmental Protection Agency, Idaho Department of Health and Welfare, November 1998.

DOE-ID, 1999, *Final Record of Decision for Test Area North, Operable Unit 1-10,* DOE/ID-10682, Rev. 0, U.S. Department of Energy Idaho Operations Office, October 1999.

DOE-ID, 2004, *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Deactivation, Decontamination, and Decommissioning,* DOE/ID-10587, Rev. 8, U.S. Department of Energy Idaho Operations Office, March 2004.

DOE-STD-1090-01, 2001, “Hoisting and Rigging,” Rev. 3, U.S. Department of Energy, April 2001.

EDF-2167, 2002, “VCO NEW-TAN-008 Characterization—TAN-615 Pits/Sumps,” Rev. 0, Idaho National Engineering and Environmental Laboratory, May 2002.

EGG, 1983, *Final Report Decontamination and Decommissioning of TAN Radioactive Liquid Waste Evaporator System (PM-2A),* EGG-2236, Idaho National Engineering Laboratory, March 1983.

Environmental Protection and Compliance, 2004, *Manual 17—Waste Management*, Rev. 68, Idaho National Engineering and Environmental Laboratory, June 2004.

Form 340.02, 2002, “Employee Job Function Evaluation,” Rev. 9, Idaho National Engineering and Environmental Laboratory, August 2002.

Form 361.24, 2000, “Tailgate Attendance Roster,” Rev. 2, Idaho National Engineering and Environmental Laboratory, February 2000.

Form 361.25, 1999, “Group Read & Sign Training Roster,” Rev. 1, Idaho National Engineering and Environmental Laboratory, May 1999.

Form 361.47, 2001, “Hazardous Waste Operations (HazWoper) Supervised Field Experience Verification,” Rev. 5, Idaho National Engineering and Environmental Laboratory, July 2001.

Form 412.11, 2004, “Document Management Control System (DMCS) Document Action Request (DAR),” Rev. 11, Idaho National Engineering and Environmental Laboratory, June 2004.

Form 432.57, 1998, “Excavation Checklist,” Rev. 0, Idaho National Engineering and Environmental Laboratory, February 1998.

Form 433.01, 2002, “Outage Request,” Rev. 4, Idaho National Engineering and Environmental Laboratory, October 2002.

GDE-140, 2003, “Decontaminating Sampling Equipment,” Rev. 0, Idaho National Engineering and Environmental Laboratory, April 2003.

GDE-6212, 2004, “Hazard Mitigation Guide for Integrated Work Control Process,” Rev. 3, *Manual 6–Maintenance*, Idaho National Engineering and Environmental Laboratory, March 2004.

Idaho Code § 39-4401 et seq., 1983, “Hazardous Waste Management Act of 1983,” State of Idaho, Boise, Idaho.

INEEL, 2001, *Voluntary Consent Order NEW-TAN-008 System Identification TAN–616 Liquid Waste Treatment System*, INEEL/EXT-2000-01263, Rev. 1, Idaho National Engineering and Environmental Laboratory, June 2001.

INEEL, 2002, *Health and Safety Plan for the Decontamination and Dismantlement of the Liquid Waste Treatment Plant (TAN-616),* INEEL/EXT-2000-00808, Rev. 2, Idaho National Engineering and Environmental Laboratory, October 2002.

INEEL, 2003, *Final Report for the Decontamination and Decommissioning of the Test Area North-615,* INEEL/EXT-02-01118, Rev. 0, Idaho National Engineering and Environmental Laboratory, January 2003.

INEEL, 2004a, *Field Sampling Plan for the HWMA/RCRA Closure of the TAN-616 Liquid Waste Treatment Facility,* INEEL/EXT-02-00908, Rev. 2, Idaho National Engineering and Environmental Laboratory, January 2004.

INEEL, 2004b, *Risk-Based Screening and Assessment Approach for Waste Area Group 1 Soils,* INEEL/EXT-03-00540, Rev. 0, Idaho National Engineering and Environmental Laboratory, May 2004.

MCP-7, 2004, "Radiological Work Permit," Rev. 19, *Manual 15B—Radiation Protection Procedures,* Idaho National Engineering and Environmental Laboratory, March 2004.

MCP-8, 2003, "Performing Management Assessments and Management Reviews," Rev. 7, *Manual 13B—Quality and Requirements Management Procedures*, Idaho National Engineering and Environmental Laboratory, September 2003.

MCP-93, 2004, "Health Physics Instrumentation," Rev. 13, *Manual 15B—Radiation Protection Procedures,* Idaho National Engineering and Environmental Laboratory, April 2004.

MCP-137, 2004, "Radioactive Source Accountability and Control," Rev. 8, *Manual 15B—Radiation Protection Procedures,* Idaho National Engineering and Environmental Laboratory, March 2004.

MCP-139, 2004, "Radiological Surveys," Rev. 11, *Manual 15C—Radiological Control Procedures,* Idaho National Engineering and Environmental Laboratory, April 2004.

MCP-148, 2000, "Personnel Decontamination," Rev. 4, *Manual 15C—Radiological Control Procedures,* Idaho National Engineering and Environmental Laboratory, July 2000.

MCP-153, 2002, "Industrial Hygiene Exposure Assessment," Rev. 6, *Manual 14B—Safety and Health—Occupational Medical and Industrial Hygiene,* Idaho National Engineering and Environmental Laboratory, October 2002.

MCP-190, 2003, "Event Investigation and Occurrence Reporting," Rev. 10, *Manual 9—Operations,* Idaho National Engineering and Environmental Laboratory, November 2003.

MCP-199, 2004, "Total Containment Glovebags and Gloveboxes for Radiological Control," Rev. 6, *Manual 15B—Radiation Protection Procedures,* Idaho National Engineering and Environmental Laboratory, March 2004.

MCP-425, 2003, "Radiological Release Surveys and the Control and Movement of Contaminated Materials," Rev. 6, *Manual 15B—Radiation Protection Procedures,* Idaho National Engineering and Environmental Laboratory, January 2003.

MCP-432, 2004, "Radiological Personal Protective Equipment," Rev. 0, *Manual 15B—Radiation Protection Procedures,* Idaho National Engineering and Environmental Laboratory, May 2004.

MCP-553, 2003, "Stop Work Authority," Rev. 7, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, April 2003.

MCP-1194, 2003, "Logbook Practices for ER and D&D&D Projects," Rev. 1, *Environmental Restoration Work Processes Manual*, Idaho National Engineering and Environmental Laboratory, May 2003.

MCP-2692, 2004, "Ergonomics Program," Rev. 4, *Manual 14B—Safety and Health—Occupational Medical and Industrial Hygiene,* Idaho National Engineering and Environmental Laboratory, April 2004.

MCP-2703, 2004, “Carcinogens,” Rev. 2, *Manual 14B—Safety and Health—Occupational Medical and Industrial Hygiene,* Idaho National Engineering and Environmental Laboratory, May 2004.

MCP-2704, 2004, “Heat and Cold Stress,” Rev. 3, *Manual 14B—Safety and Health—Occupational Medical and Industrial Hygiene,* Idaho National Engineering and Environmental Laboratory, February 2004.

MCP-2707, 2001, “Compatible Chemical Storage,” Rev. 4, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, February 2001.

MCP-2720, 2003, “Controlling and Monitoring Exposures to Lead,” Rev. 4, *Manual 14B—Safety and Health—Occupational Medical and Industrial Hygiene*, Idaho National Engineering and Environmental Laboratory, June 2003.

MCP-2725, 2001, “Field Work at the INEEL,” Rev. 3, *Manual 14A–Safety and Health–Occupational Safety and Fire Protection*, Idaho National Engineering and Environmental Laboratory, January 2001.

MCP-2726, 2003, “Respiratory Protection,” Rev. 9, *Manual 14B—Safety and Health—Occupational Medical and Industrial Hygiene*, Idaho National Engineering and Environmental Laboratory, December 2003.

MCP-2739, 1997, “Material Handling, Storage, and Disposal,” Rev. 0, *Manual 14A–Safety and Health–Occupational Safety and Fire Protection*, Idaho National Engineering and Environmental Laboratory, February 1997.

MCP-2745, 2001 “Heavy Industrial Vehicles,” Rev. 1, *Manual 14A–Safety and Health-Occupational Safety and Fire Protection*, Idaho National Engineering and Environmental Laboratory, December 2001.

MCP-2749, 2002, “Confined Spaces,” Rev. 5, *Manual 14B—Safety and Health—Occupational Medical and Industrial Hygiene*, Idaho National Engineering and Environmental Laboratory, November 2002.

MCP-2750, 2002, “Preventing Hantavirus Infection,” Rev. 3, *Manual 14B—Safety and Health—Occupational Medical and Industrial Hygiene*, Idaho National Engineering and Environmental Laboratory, April 2002.

MCP-3003, 2003, “Performing Pre-Job Briefings and Documenting Feedback,” Rev. 11, *Manual 9—Operations,* Idaho National Engineering and Environmental Laboratory, May 2003.

MCP-3449, 2003, “Safety and Health Inspections,” Rev. 3, *Manual 14A–Safety and Health–Occupational Safety and Fire Protection*, Idaho National Engineering and Environmental Laboratory, November 2003.

MCP-3480, 2004, “Environmental Instructions for Facilities, Processes, Materials, and Equipment,” Rev. 9, *Manual 8—Environmental Protection and Compliance*, Idaho National Engineering and Environmental Laboratory, March 2004.

MCP-3562, 2003, "Hazard Identification, Analysis, and Control of Operational Activities," Rev. 8, *Manual 9—Operations*, Idaho National Engineering and Environmental Laboratory, October 2003.

MCP-3650, 2004, "Chapter IX—Level I Lockouts and Tagouts," Rev. 4, *Manual 9—Operations*, Idaho National Engineering and Environmental Laboratory, April 2004.

MCP-3651, 2004, "Chapter IX—Level II Lockouts and Tagouts," Rev. 5, *Manual 9—Operations*, Idaho National Engineering and Environmental Laboratory, April 2004.

NFPA 70E, 2004, "Standard for Electrical Safety Requirements for Employee Workplaces," National Fire Protection Association, January 1, 2004.

NIOSH, 1985, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, DHHS (NIOSH) Publication No. 85-115, National Institutional of Occupational Safety and Health/Occupational Safety and Health Administration/United States Coast Guard/U.S. Environmental Protection Agency.

PLN-114, 2003, "INEEL Emergency Plan/RCRA Contingency Plan," Rev. 20, *Manual 16A–Emergency Preparedness Base Plan,* Idaho National Engineering and Environmental Laboratory, August 2003.

PLN-694, 2004, "Project Execution Plan for the Balance of INEEL Cleanup Project," Rev. 5, Idaho Completion Project, May 2004.

PRD-5, 2002, "Boilers and Unfired Pressure Vessels," Rev. 5, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, June 2002.

PRD-22, 2004, "Excavation and Surface Penetration," Rev. 4, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, March 2004.

PRD-25, 2003, "Activity Level Hazard Identification, Analysis, and Control," Rev. 3, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, June 2003.

PRD-183, 2004, "Radiological Control Manual," Rev. 7, Idaho National Engineering and Environmental Laboratory, February 2004.

PRD-308, 2003, "Handling and Use of Flammable and Combustible Liquids," Rev. 0, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, June 2003.

PRD-600, 2003, "Hoisting and Rigging," Rev. 3, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, March 2003.

PRD-1004, 1997, "Stop Work Authority," Rev. 0, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, November 1997.

PRD-1006, 1997, "Safety Surveillance," Rev. 0, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, November 1997.

PRD-1007, 2002, "Work Coordination and Hazard Control," Rev. 5, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, February 2002.

PRD-2001, 2001, "Personal Protective Equipment," Rev. 3, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, June 2001.

PRD-2002, 2001, "Fall Protection," Rev. 3, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, June 2001.

PRD-2003, 2004, "Ladders," Rev. 1, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, May 2004.

PRD-2004, 2004, "Scaffolding," Rev. 3, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, May 2004.

PRD-2005, 2001, "Walking and Working Surfaces," Rev. 1, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, June 2001.

PRD-2006, 2001, "Aerial Lifts and Elevating Work Platforms," Rev. 1, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, June 2001.

PRD-2007, 2003, "Hoisting and Rigging," Rev. 2, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, January 2003.

PRD-2009, 1997, "Compressed Gases," Rev. 0, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, November 1997.

PRD-2010, 2001, "Welding, Cutting, and Other Hot Work," Rev. 1, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, June 2001.

PRD-2011, 2000, "Electrical Safety," Rev. 1, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, April 2000.

PRD-2012, 2002, "Lockouts and Tagouts," Rev. 4, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, August 2002.

PRD-2014, 2004, "Excavation and Surface Penetrations," Rev. 7, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, June 2004.

PRD-2015, 2003, "Hand and Portable Power Tools," Rev. 5, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, June 2003.

PRD-2016, 2003, "Material Handling, Storage, and Disposal," Rev. 3, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, June 2003.

PRD-2019, 1998, "Motor Vehicle Safety," Rev. 1, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, January 1998.

PRD-2020, 2001, "Heavy Industrial Vehicles," Rev. 2, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, June 2001.

PRD-2022, 1998, "Safety Signs, Color Codes, and Barriers," Rev. 1, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, January 1998.

PRD-2107, 2003, "Heat and Cold Stress," Rev. 3, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, June 2003.

PRD-2108, 2001, "Hearing Conservation," Rev. 1, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, June 2001.

PRD-2109, 2003, "Respiratory Protection," Rev. 3, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, June 2003.

PRD-2110, 2003, "Confined Spaces," Rev. 2, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, June 2003.

PRD-2201, 2003, "Flammable and Combustible Liquid Storage," Rev. 3, *Subcontractor Requirements Manual,* Idaho National Engineering and Environmental Laboratory, June 2003.

PRD-5030, 2004, "Environmental Requirements for Facilities, Processes, Materials, and Equipment," Rev. 3, *Manual 8—Environmental Protection and Compliance,* Idaho National Engineering and Environmental Laboratory, March 2004.

PRD-5038, 2003, "Cryogenic Systems," Rev. 0, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection*, Idaho National Engineering and Environmental Laboratory, April 2003.

PRD-5040, 2004, "Handling and Use of Compressed Gases," Rev. 4, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, June 2004.

PRD-5067, 2004, "Ladders," Rev. 4, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, January 2004.

PRD-5096, 2003, "Fall Protection," Rev. 1, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, October 2003.

PRD-5098, 2004, "Scaffolding," Rev. 4, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, April 2004.

PRD-5099, 2002, "Electrical Safety," Rev. 3, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, September 2002.

PRD-5101, 2001, "Portable Equipment and Handheld Power Tools," Rev. 0, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, April 2001.

PRD-5103, 2001, "Walking and Working Surfaces," Rev. 0, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, March 2001.

PRD-5107, 2004, “Aerial Lifts and Elevating Work Platforms,” Rev. 0, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, February 2004.

PRD-5110, 2001, “Welding, Cutting, and Other Hot Work,” Rev. 0, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, July 2001.

PRD-5117, 2001, “Accident Prevention Signs, Tags, Barriers, and Color Codes,” Rev. 0, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, September 2001.

PRD-5121, 2004, “Personal Protective Equipment,” Rev. 5, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, April 2004.

PRD-5123, 2002, “Motor Vehicle Safety,” Rev. 0, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection,* Idaho National Engineering and Environmental Laboratory, August 2002.

Radiation Protection Department, 2004a, *Manual 15B—Radiation Protection Procedures*, Rev. 125, Idaho National Engineering and Environmental Laboratory, May 2004.

Radiation Protection Department, 2004b, *Manual 15C—Radiological Control Procedures*, Rev. 57, Idaho National Engineering and Environmental Laboratory, June 2004.

Safety and Fire Protection Department, 2004a, *Manual 14A—Safety and Health—Occupational Safety and Fire Protection*, Rev. 141, Idaho National Engineering and Environmental Laboratory, June 2004.

Safety and Fire Protection Department, 2004b, *Manual 14B—Safety and Health—Occupational Medical and Industrial Hygiene*, Rev. 79, Idaho National Engineering and Environmental Laboratory, May 2004.

STD-101, 2003, “Integrated Work Control Process,” Rev. 15, *Manual 6—Maintenance,* Idaho National Engineering and Environmental Laboratory, July 2003.